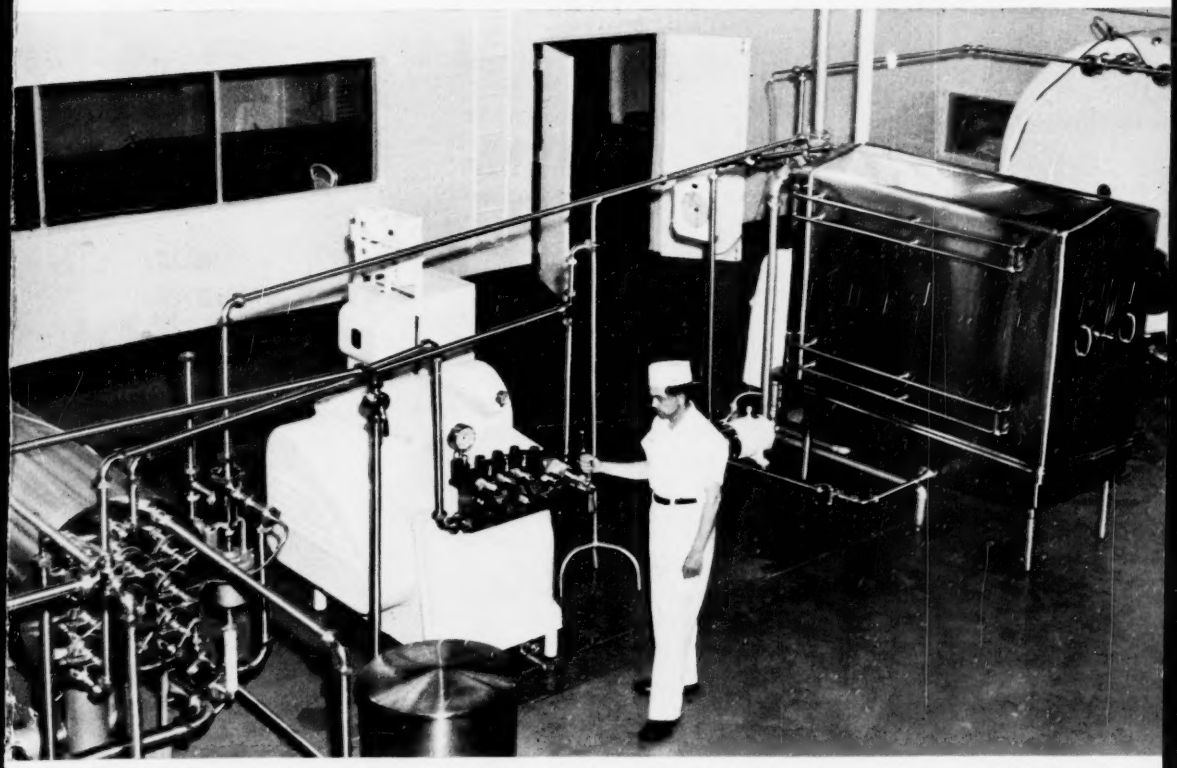
NATIONAL EDITION

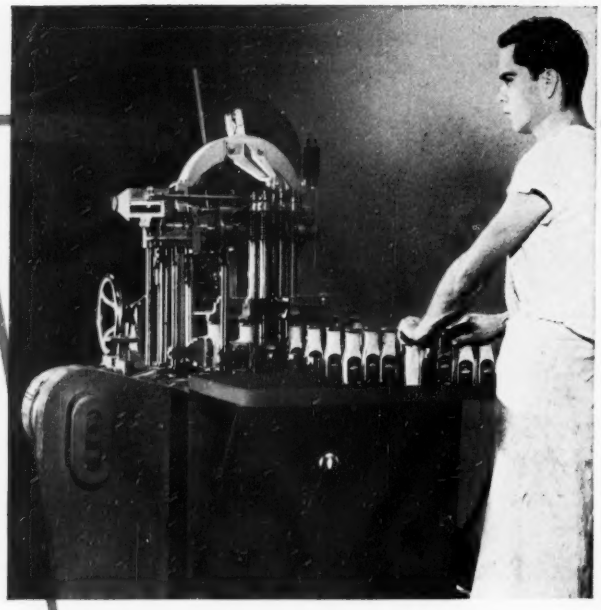
Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



Advanced ice cream production at Plantation Foods includes continuous mix pasteurization in steam-vacuum unit, left. (Page 46).

SEPTEMBER, 1950: What's wrong in frozen food distribution, Swift builds own men, Quick insect counts, Robot evaporator, Process innovations



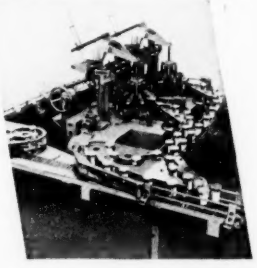
MEETS CRITICAL REQUIREMENTS OF THE WEST COAST HORSERADISH COMPANY

Horseradish is a perishable product, its packaging scheduled to meet daily turn-over orders and frequent small deliveries. Therefore labeling *must* be fast — entirely trouble-free and efficient at peak loads. That's why the West Coast Horseradish Company of Los Angeles streamlined its operations with this WORLD Uni-Turret Labeler.

A setup like this is a natural for the Uni-Turret. Its many experienced-engineered advancements — such as the automatic, synchronized Feed Control which protects against traffic jams, breakage and costly delays — are made to order for (1) speedy, semi-automatic or fully automatic application of front body labels, neck labels or all around neck wraps to . . . (2) any shape, any size containers from 3″ to 13″ high . . . (3) all cleanly, neatly, precisely labeled at the rate of 60 to 75 per minute.

—*also*

TWIN-TURRET



The above goes double for the WORLD Twin-Turret: 120 to 140 per minute. Add the extra Unit when needed; one motor operates both. Write for descriptive Bulletin.

WORLD Uni-Turret Labeler

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles Denver Louisville Salt Lake City El Paso Seattle Portland Phoenix London Montreal Toronto Winnipeg Newfoundland Vancouver Mexico City Sydney, Australia Wellington, N.Z. San Juan, P.R. Ciudad Trujillo, D.R. Honolulu, T. H.

FOOD INDUSTRIES, September, 1950, Vol. 22, No. 9. Published monthly by McGraw-Hill Publishing Co., Inc. Publisher, Wallace F. Traendly. Price 35¢ per copy. Publication Office, 99-129 N. Broadway, Albany 1, N. Y. Subscription rates: United States and possessions, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Canada, $4 for 1 yr., $6 for 2 yr., $8 for 3 yr. (payable in Canadian or U. S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yr., $10 for 3 yr. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879.

FREE READER SERVICE . . .

HOW TO USE POSTCARD

Circle numbers of items you want to know more about; fill in your name and address; drop in mail (no postage required). We will tell companies what you are interested in and they reply direct to you.

TO MAKE IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes: (1) editorial items on new equipment, new products, new literature; (2) products advertised; (3) advertisers.

WHAT THE NUMBERS MEAN

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items: There is a page number on the postcard for each editorial item; ABC's distinguish the specific items on the page.

EDITORIAL ITEMS

For more data, circle item number on postcard

NEW PRODUCTS

	page		page
Beer can, new design	118A	Ice cream, color pack	117A
Breakfast food, sweet potato	120C	Lobster, broiled and frozen	117B
Chicken, fried and frozen	114A, B	Papaya, frozen slices	120A
Cookie pack, rip opener	120B	Soup, split pea	120D
Frozen broiled lobster	117B	Sweet potato breakfast food	120C
Frozen fried chicken	114A, B	White-sauce powder	114C
Frozen papaya slices	120A	Wine vinegar, gift package	118B
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NEW EQUIPMENT

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Bun molder, plastic	96A	Motor, corrosion resistant	95C
Centrifugal pumps	102E	Plunger filler, high speed	94B
Cleaning sponge, stainless	102C	Pump, removable rotor	94A
Cold water flow control	99A	Pumps, centrifugal	102E
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Concentrate calculator	96C	Rubber gloves, sure grip	102D
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READER SERVICE POSTCARD

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95B	100B	117C	161E	161O	162F					
95C	102A	118A	161F	161P	162G					
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4c	30-31a	108	133	148a	161b	TR171	190	205a	TR216c
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OTHER REQUEST, OR COMMENT.....

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Name..... Position.....

Company .....

Address .....

Card Expires December 10, 1950

READER SERVICE POSTCARD

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No 38

94A	98C	114C	161B	161L	162C					
94B	99A	117A	161C	161M	162D					
95A	100A	117B	161D	161N	162E					
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95C	102A	118A	161F	161P	162G					
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Address .....

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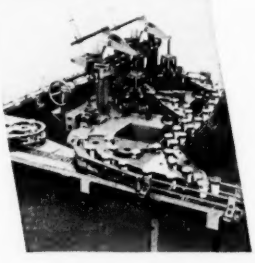

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MACHINERY COMPANY
...ic and Semi-Automatic Labelers for Every Purpose
TER, MASSACHUSETTS
...burgh Chicago San Francisco Los Angeles Denver
...Paso Seattle Portland Phoenix London Montreal
...mdland Vancouver Mexico City Sydney, Australia
...an, P. R. Ciudad Trujillo, D. R. Honolulu, T. H.

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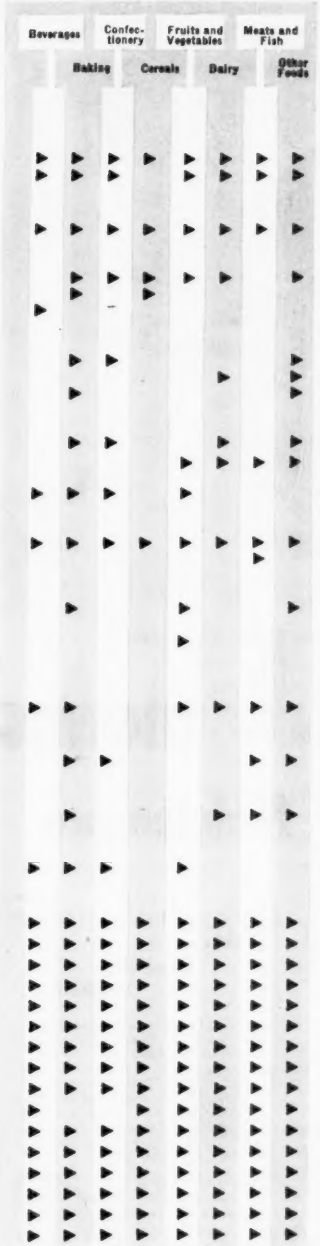

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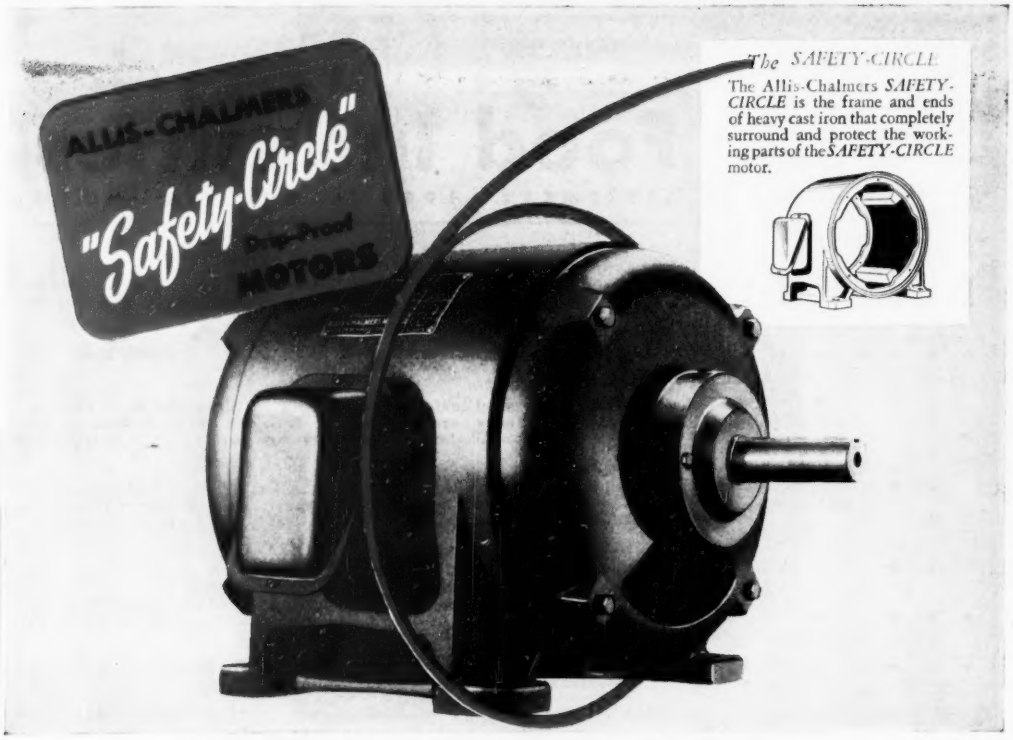

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HIGHLIGHTS

High costs of frozen foods must be attacked through the present distribution system, according to Gerald A. Fitzgerald. But first the industry must put its house in order by: (1) Setting up standards; (2) establishing codes; (3) promoting itself through industry-wide advertising; (4) providing an accepted emblem of uniformity; and (5) building up cooperative distribution practices. (Pg. 65)

Subtilin did not completely destroy spores or other dangerous bacteria in food canning tests at the laboratories of the National Canners Assn. NCA agreed that it helped prevent rapid development of spores, but cautions that research will have to be directed toward finding means "by which subtilin or some other antibiotic can be made actually destructive to the spores or cause their permanent inhibition." (News)

Tentative bread standards, as determined at long last by F&DA, exclude the controversial emulsifiers and softeners. Commissioners were not satisfied that these chemicals had been proved safe beyond all possible doubt. If exceptions filed do not result in changes in final standards, bakers affected can easily shift to the permitted mono-diglycerides. (News)

A new method for detecting insect contamination in raw materials prior to processing slashes test time and labor 75 percent over old Wildman technic. New method is also simpler to perform, results in a more efficient recovery of contaminants, and serves as a quality-control tool. (Pg. 44)

Something new in automatic control, an automatic density regulator, has made it possible for Pasco Packing Co, Dade City, Fla., to robotize its new thermocompression juice evaporators. Close control over quality, high capacity and good efficiency are benefits. Operating on the buoyancy principle, the density unit controls Brix at 55 deg., plus or minus 0.1 deg. (Pg. 58)

Continuous mixing of cake batters, as performed at Farm Crest Bakeries in Detroit, yields cakes of higher quality, better appearance, and with increased shelf life. And the bakery gets greater production and product uniformity, improved sanitation and efficient utilization of raw materials—all without benefit of skilled labor. (Pg. 51)

Insulated ice cream packages are an innovation at Plantation Foods, Inc., Uleta, Fla. These are sold in supermarkets from open-top low-temperature display cases, the insulation keeping the ice cream frozen until the housewife completes her shopping and gets the product in her refrigerator. Low-cost corrugated paperboard, to be applied by machine, is the insulator. (Pg. 46)

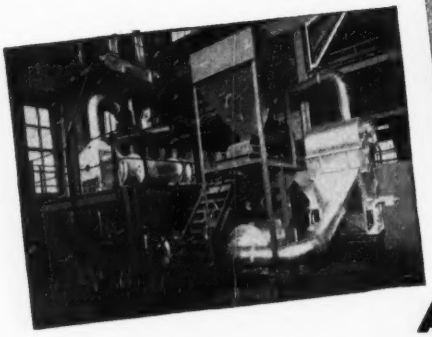
An extra $80,000 a crop is salvaged by the California Walnut Growers Assn. following the installation of a specially developed flotation process for recovering small pieces of edible walnut meats from intermingled shells after commercial shelling operations. Process involves drawing air from siftings in vacuum tanks, adding water to submerge materials, and then separating meats from shells by flotation. (Pg. 53)

Silicone-glazed bread pans now are easily deglazed in 5 to 10 minutes at Fuchs Baking Co., South, Miami, Fla. The pans are simply immersed in a hot solution of Dowanol DC, then rinsed in a converted commercial dishwasher. Deglazing formerly involved boiling for 8 hours in a caustic soda solution. Fuchs gets 290 bakes per glazing. Pan greasing operation and grease fumes in ovens are eliminated. (Pg. 84)

HOW SHOULD YOU DRY MATERIALS?

HOW SHOULD YOU COOL MATERIALS?

HOW SHOULD YOU ROAST MATERIALS?



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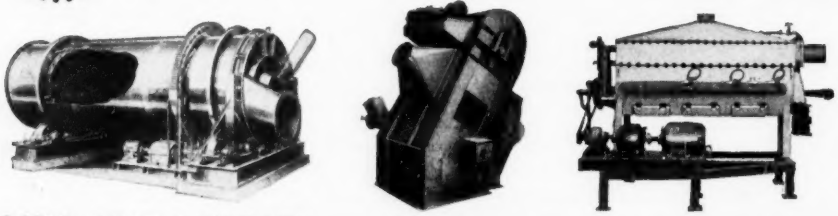


LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities. 11.822

The Talk of the Industry

Wartime Packaging "Progress"

Current conditions being reminiscent of World War II, we recall an interesting bit of wartime packaging history. It involves a prominent company which produces vacuum-packed coffee.

As materials became short, this firm shifted from a tin can to a black-plate container. This saved 1,100 tons of tin, but used 85,000 tons of steel and 13 tons of rubber for 400 million pounds of coffee.

Next the company went to glass with a metal closure. This required no rubber nor tin and only 4,300 tons of steel for 260 million pounds of product.

Finally, the metal closure was replaced with a fiber one. Result: No tin, no rubber, no steel. Yet the coffee was vacuum packed and still good to the last drop.

Speaking of Eventualities

In the event of complete industrial mobilization for a major war, food processors might well be expected to do some things quite strange to them. Last time, for instance, a flour mill used its machine shop to make parts for military equipment. A big candy plant converted to the production of radio condensers. Some processors of non-essential foods shifted to more vital basic products. And many plants set up dehydration operations.

We're getting ahead of the current situation, but there's no harm in considering eventualities.

Both War and Politics Enter

Theoretically, all decisions in Washington are now made primarily on the basis of what's best in the emergency. Practically, neither party on Capitol Hill nor the "Fair Dealers" in executive offices can entirely forget their ambitions and their social "cause" in an election year. Political considerations definitely are subordinated, but by no means neglected.

Just a point to keep in mind in evaluating future decisions affecting food production, processing and distribution.

Cleaner Equipment Quicker

We recently came across a dairy which has studied detergents and developed a cleaning-solution formula which works like a charm. Containing a synthetic detergent, the solution leaves stainless steel equipment bright and shiny when it dries. And it has curtailed trouble from leaks around agitator shafts because it does not corrode the metal.

Sure, it costs a little more. But it reduces clean-up time and labor—even removes milkstone readily. Unfortunately, the formula is not available. But you can figure it out the way this dairy did.

Pays to Give More Away

If you plan to obtain new customers by handing out product samples door to door, what is the most efficient technic? Should you give only one sample to a potential customer, or have your men call later with more samples?

Studies by Geare-Marston show that you get the most new customers for your expense dollar if you give each prospect four samples at different times. In other words, it is better to give, say, 400 samples to 100 people than to 400.

Assuming that the one-sample operation costs $1.00 per new customer, the expense per customer gained is 91, 75 and 63 cents, respectively, for two- three- and four-sample campaigns. Then the cost starts up again.

You gotta hit 'em four times to convince 'em.

Brannan Discovers New Law

Secretary Brannan has confessed difficulty in giving away surplus foods. He asked Congress for $50 million to repackage these surpluses, pay freight, and finance other details of a give-away program.

The Secretary is finding it impossible to repeal the law of supply and demand. Price-support efforts suspend the effects of that law only briefly, at tremendous cost. And if we taxpayers spend still more to get the surpluses into consumption, then we shall have to buy the additional surpluses created by dumping current surpluses.

And so on *ad infinitum*. Would be better to give the stuff to any hungry nation that would pay the transportation cost.

Hors d'Oeuvres

■ The magazine *Factory Management and Maintenance* is preparing to give up entirely on horses, switching that portion of the editorial interests to cows. They have uncovered a curled casein fiber that does better and cheaper all the things high grade curled horsetail hair used to do. Well, maybe not all. They don't claim the fiber will swish.

■ We can credit the high dollar buying power of that day for the low prices on Delmonico's 1834 menu. But the relative values are another matter. Pigs Head, Fried Fish and Beef Steak are among the 4c items listed, while Hamburger Steak is down for a dime. Kinda makes you wonder about great great grandpop.

■ National Macaroni Institute boasts 8,213 recipes, gathered during the nine centuries since Marco Polo brought the secret of macaroni making from China to Italy. Now, if they could only complete the job by getting the recipes developed *before* Marco took his trip.

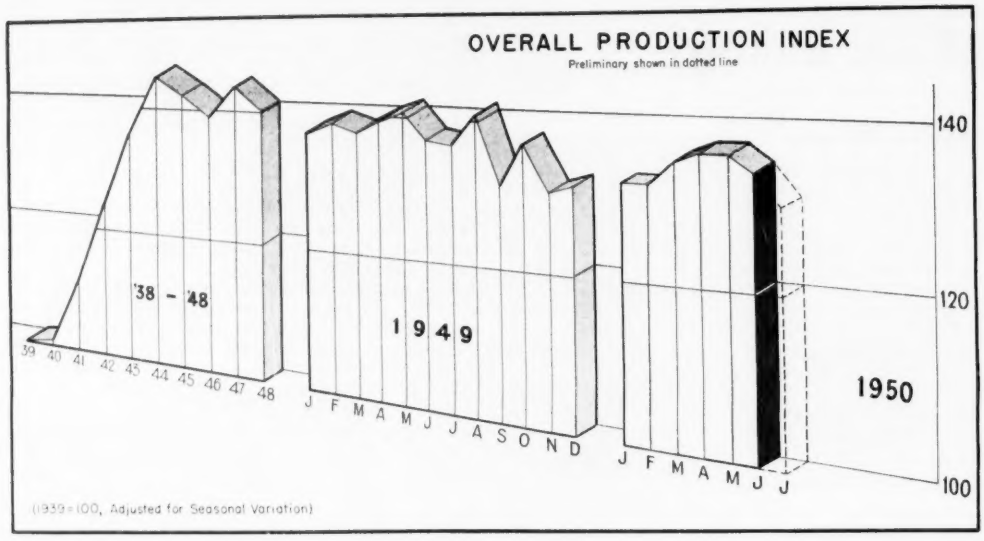
■ Poultry specialists at Ohio State U. point out that it's vital to pack eggs with the large end up. The reverse puts pressure on the air cell, resulting in gradually loosened membrane. Good thing the big city subways don't have to pack in humans that way.

■ Hog feed coupons under England's socialist government allow only so much feed per pig, *Farm Journal* tells us. Size of pig doesn't matter. So the feeder has to draw and save feed when the pig is little so it can be fed when it gets big. System might solve our lard surplus headache, but by the time you got to that point you'd hardly notice one less headache.

■ Time to start thinking what's to be done with all the coffee and sugar that's going to pile up in distribution channels after the hysteria gals wake up and start using their hoarded supplies.

J.A.J.J.

FI Index and Outlook


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
'38 - '48
1949
1950
39 40 41 42 43 44 45 46 47 48
J F M A M J J A S O N D
J F M A M J J
140
120
100
(1939=100, Adjusted for Seasonal Variation)

Late Vegetable and Short Fruit Crops Pull Processing Index Down

Sharp drop in flour milling, due to lowered exports, drops total output despite gains in other lines

Processing activity slipped in July as the fruit and vegetable packs failed to show their usual seasonal rise. Late vegetable crops, particularly peas, and actual shortages of some fruits are believed to account for most of the drop in the total volume of food production.

Revised figure for June (135) shows a drop in total activity, although most divisions of the food industry made gains in that month. A very sharp decline in flour production, resulting from the unfavorable export situation, pulled down the overall index.

Meanwhile food is moving over the retail grocery counters at a terrific pace. And distributors are continuing to press for more inventory. This heavy demand seems sure to bring about a rise in processing activity wherever crops permit. The immediate outlook hinges largely on the late fruit and vegetable packs: Corn, tomatoes, apples and other fall fruits. Looking further ahead, prospects for a heavy season in grain milling and meat packing favor an increase in total production at food plants.

Estimates of 1950 Pack

The canning season is now far enough advanced to permit forecasts of how the year's pack will add up. Fruit canners will turn out about 65,000,000 cases, 5 percent less than a year ago. The vegetable pack promises to come close to last year's 127,000,000 cases. Canning activity to date has run further behind 1949. But later crops are expected to pull up the totals.

Here are the indicated packs of major items for 1950, compared with 1949. These are FOOD INDUSTRIES estimates based on reports from the Commerce and Agricultural Departments.

	Millions of Cases 1950	1949
apricots	3 to 3.5	2.4
peaches	15 to 17	19.1
pears	4.5 to 5	5.8
mixed fruits	8 to 8.5	7.6
sweet cherries	1.0	1.7
red pitted cherries	3 to 3.5	2.6
corn	20 to 24	29.8
peas	25 to 26	23.5
snap beans	18 to 20	20.6
tomatoes	24 to 26	22.7

Meat Packing Prospects

The meat packers are coming into their heavy production season with demand for their products exceptionally strong. For the rest of 1950, and for 1951, the principal problem of the industry will be to secure enough livestock. Although this fall's slaughter will top last year, retail demand is so avid that packers' stocks will probably not be built up proportionately. And supplies may consequently be short until the beginning of the 1951 slaughter season.

Production in October-December is expected to be slightly larger than in the same months of 1949. Most of the

At a Glance—

(1939 = 100, with all figures adjusted for seasonal variations.)

	June 1950	May 1950	Percent Change	Year Ago
Baking	125	127	−2	−1
Butter	82	80	+3	+5
Canning	154	152	+1	−11
Cheese	167	156	+7	+4
Confectionery	130	128	+2	+3
Evap. Milk	124	123	+1	−1
Flour	102	115	−11	−12
Ice Cream	177	183	−3	−7
Malt Liquors	179	172	+4	+1
Margarine	259	225	+15	−8
Meat Products	143	150	−5	+5
Sugar	106	111	−4	+13

gain will be in pork. The spring pig crop was 3 percent greater than last year. And the fall crop is expected to be up about 5 percent. That would make the combined 1950 crop about 99,000,000 head, or 4 percent more than in 1949.

There will also be a gain in beef produced from grain-fed cattle. The number on feed in the corn belt has been 34 percent higher than a year ago. Consequently the number of choice steers marketed will be up sharply. Slaughter of grass-fed cattle will be about the same as in 1949.

The total increase in meat production will be no more than the gain in population. Per capita consumption for 1950 will only equal the 1949 level of 144 lb. But personal income is running much higher and will be further boosted by new government expenditures on defense. In particular, industrial workers, whose families account for a large share of total meat consumption, will have higher paychecks. So meat prices may hold relatively.

In 1951 meat prices are likely to rise sharply. Total supplies, including that part of 1950 output that is stored, will not be much larger next spring than they were this year. Meanwhile income will keep rising as the defense program gathers speed. The price of meat has always been tied to the income of industrial workers. And it should be noted that a 48-hour week, with overtime pay, would raise the average industrial worker's income by 30 percent. In this situation some price controls may be demanded.

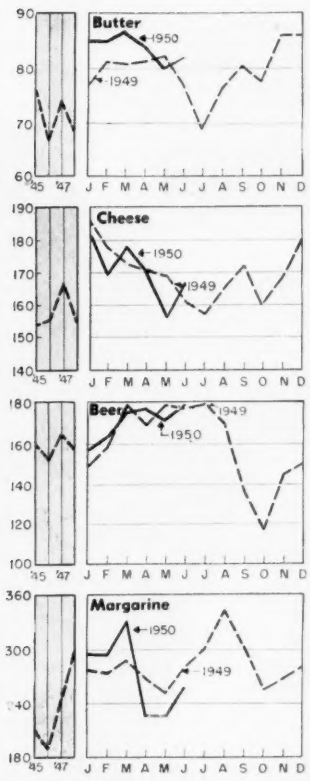
Big Meat Output

The prospect of continued high meat prices has improved chances for heavy production in 1951. Feed prices have been higher than last year, and the hog-corn ratio lower. However, if meat prices are maintained as out-lined above, and if feed crops turn out as big as expected, the ratio will favor increased livestock herds. A fairly big corn crop and larger production of oats and barley are forecast for this fall. Together with huge carryover stocks, principally corn, these new crops will provide a near-record supply of feed per animal.

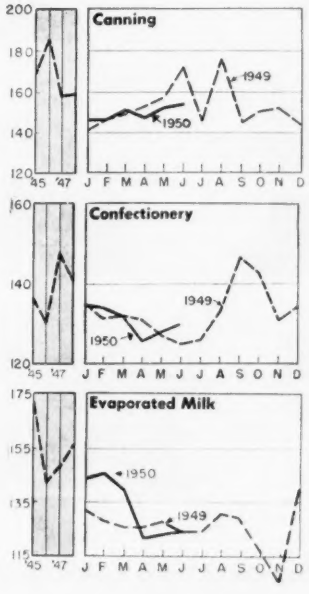
Although some of this feed will be tied up in the government support program, free supplies should be enough to encourage an increase in 1951 livestock population similar to the gain attained in 1950. Total meat production may reach 23,000,000 lb., compared to 22,400,000 lb. in the current year. This would not be a sufficient increase to hold down prices, particularly since most of the gain will come late in 1951. The government could help boost production more sharply by making some of its surplus feed available at prices below support level. But Congress has shown no disposition to permit this.

Production of lard, grease and tallow in the crop year beginning October 1950 will probably run ahead of the year just ending. The expected hog slaughter indicates a yield of 2,800,000,000 lb. of lard, a gain of 100,000,000 lb. And other by-products will show similar increases. The demand for soap, glycerine and by-product chemicals has been strengthened by the war situation.

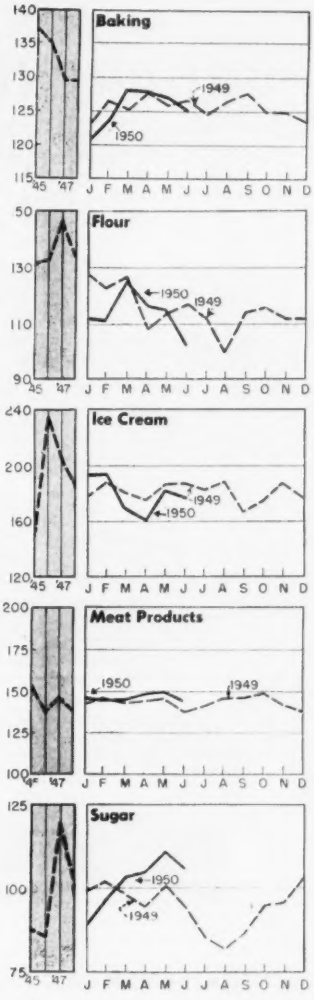
RISING ▲

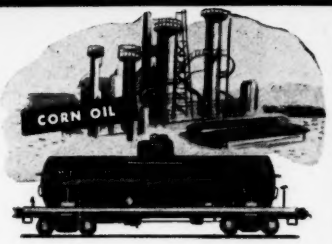


STEADY →



FALLING ▼





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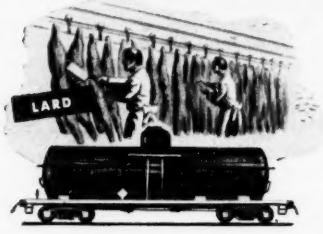

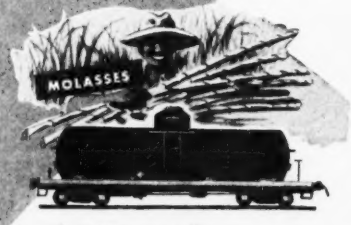

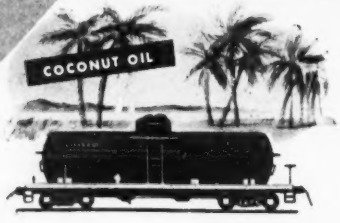

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What Washington Thinks

DEFENSE FIRST—Military programs will now take definite precedence over all other activities that can be influenced by the government. The far-reaching consequence of this is well shown by a recent announcement of Reconstruction Finance Corporation. The RFC was speaking of loans to assist housing programs, but the idea applies also to food plants. It said: "Loans which do not contribute directly to national defense will not be made if they would result in the acquisition of sizable quantities of materials, equipment, or supplies, the demand for which is in competition with those of vital importance to national defense needs."

IT'S NOT HOARDING—Food plants must maintain a reasonable stock of replacement parts and supplies needed for plant maintenance. Such equipment and material is getting scarce. But it's not hoarding to get into the market and hunt vigorously to replenish the stockroom up to a reasonable level. It is, in fact, poor judgment to neglect this responsibility.

RESEARCH COORDINATION—A special report has been made by a "Study Group of the Special Subcommittee of the House Committee on Agriculture". With the aid of a distinguished group of non-government people, some very important conclusions have been reached regarding the research of the U.S. Department of Agriculture. Perhaps the most important single conclusion is that all of the Department research should be conducted under the direction of one official. And it is evident that this official should be a distinguished director and coordinator of both fundamental and applied research. Furthermore, it is obvious that the committee likes the job that Dr. P. V. Cardon is doing as the head of Agricultural Research Administration. It looks as though Congress is going to insist on the sort of further research coordination that can and must be given in order to get the most benefit for the public and for industry from the government spendings on research programs.

PLENTY OF SUGAR—Sugar is a political commodity, as well as a food raw material. Hence, there was much effort in Washington to work out a plan that would please the sugar growers of this country before enlarged imports were authorized. But there will be plenty of sugar brought in from Cuba, Puerto Rico, and elsewhere, even enough to offset the original hoarding rush. There are more voters with market baskets than sugar growers, and the supply must be adequate for them without extravagant price rises. The same is true of a few other commodities for which the government can control total supply.

SELLING UNCLE SAM—A whole new set of government purchasing policies is developing. Anyone who wants to sell Uncle Sam supplies during the emergency period better start in right away making his first contacts with purchase offices so that a suitable influence may be exerted on specifications for materials. Buying is not yet big, but it will be. And it is unsafe to assume that the old purchasing offices and the old specifications will continue.

OLEO PACKAGES—Manufacturers of margarine have done an amazingly good job in remaking their packages to meet a meticulous definition given by Congress when it passed the new oleo law last Spring. It is evident, however, that sooner or later most of Section 407(b) ought to be repealed, since it amounts to nothing more than an harrassment of makers and dealers. These folks have gained the privilege of selling tax free colored oleo, but only under conditions that Congress was persuaded by butter lobbyists to include because of the nuisance character. Further legislation can hardly be expected in the middle of a military emergency. But revision is sure to follow our return to normal conditions.

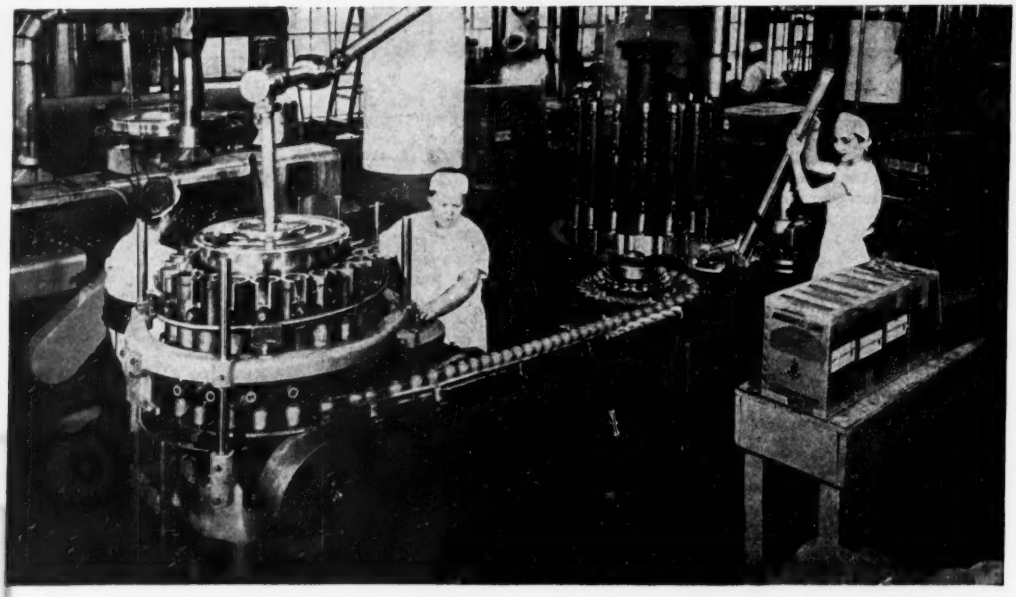
PRICE BOOSTS—Congress is reflecting the indignation of American housewives and householders regarding the extravagant price increases that have occurred since the first of June. The result is certainly going to be a more drastic set of controls than otherwise would have been seriously talked about in Congress. It is not going to be safe for Senators and Representatives to go home and face their constituents at election time unless they have legislated drastic restrictions of this sort.

STRATEGICS—The long neglected purchase of strategic and critical materials for the Military Stockpile got quick attention when the seriousness of the Korean situation first became evident. Now the real problem is to build some sort of reserve without wrecking the operations of essential industry in the process. Major problems do not involve food, except in a very few instances. This is fortunate for the food technologists, except those interested in tin and fats and oils. It is now an urgent question what the effect of prospective tin scarcity is going to be. The answer to that question will be determined primarily by the ability of tin to reach the United States from Singapore. If trouble develops on the Pacific supply lines, then everyone interested in tinned containers will have to resume the vigil that caused so many sleepless nights during World War II.

NO "VOLUNTARY" PROGRAM—During May, the Bureau of Animal Industry proposed that it conduct inspection of meat packing at plants that are not covered by the regular inspection service. When this proposed plan for "voluntary continuous inspection and certification" was announced, there was considerable protest. It was argued that meat plants should officially be inspected so that their products could move freely in interstate business, or they should have no food inspection. The Bureau found it inexpedient to carry out the plan first proposed. It is thought that perhaps this may indirectly increase the official food inspection where small establishments would like to get some interstate business to add to their local and intrastate activities.

WAR CONTROLS—It is not worthwhile to worry a great deal about the first forms talked about, or even tentatively put in force, for wartime control of industry. These will be burdensome. There is no escaping them. But they are likely to change. Even the President does not know in August either just what he wants or what Congress will be willing to grant. The important thing is for industry to exercise as much self control as possible so that the urge of the bureaucrats to establish greater legal interference with business may be minimized. Unfortunately, we now have to change the whole comment on "death and taxes" to recognize that "Nothing is certain but death, taxes, and government control".

—R. S. McBride, Washington, D. C.



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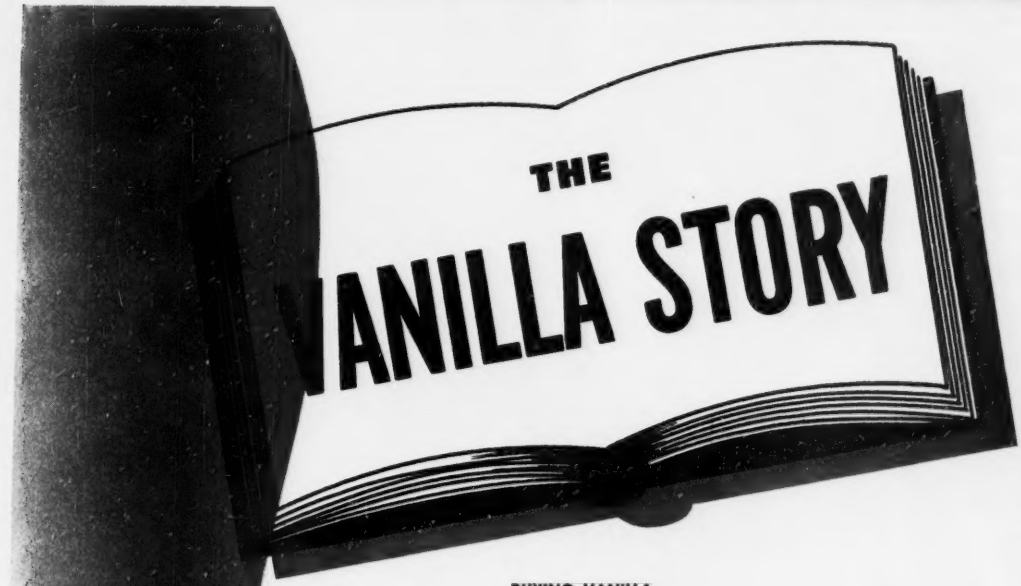

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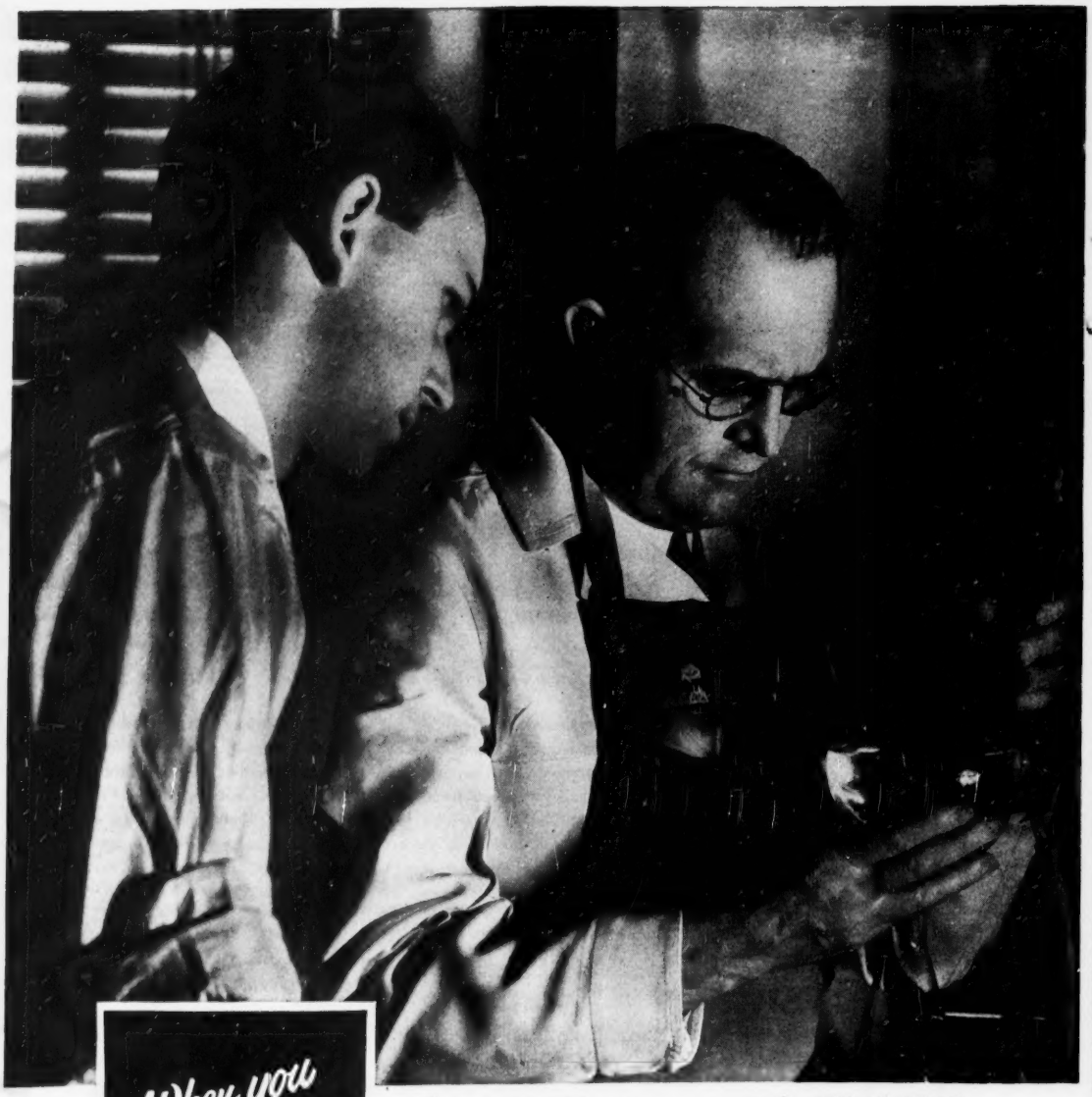

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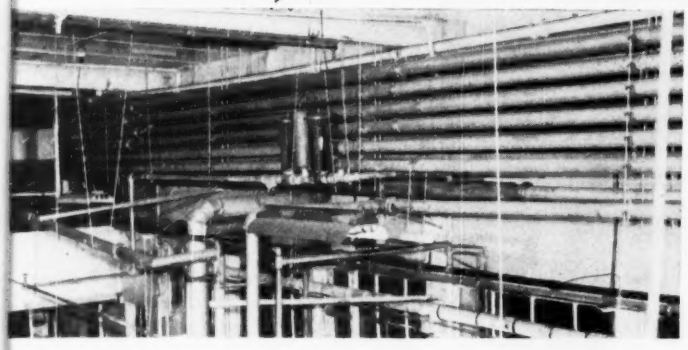
"THE MOST FAMOUS NAME IN GLASS!"

You Get Sanitary Processing plus Easy Clean-Up with *Carpenter* ATF Stainless Tubing



Hydraulic pressure blancher suspended from ceiling to save floor space. Temperature is regulated by controls which pass live steam through the jacket around perforations in the tube. Foods in process travel 1,100 ft. through the 4" dia. Carpenter Stainless Tubes. Product quality is safeguarded and clean-up time is low because of the smooth I.D. surfaces of Carpenter Stainless Tubing.

This job is a good example of the results you can get by combining your knowledge of processing with Carpenter's long experience with Stainless Tubing and Pipe.

ATF ... Analysis, Tolerance and Finish are guaranteed on every shipment of Carpenter Stainless Tubing. Call your nearest Carpenter distributor today.

Carpenter

more than corrosion resistance

STAINLESS TUBING

—guaranteed on every shipment

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.

EXPORT DEPARTMENT: Woolworth Building, New York 7, N. Y. "CARSTEELCO"

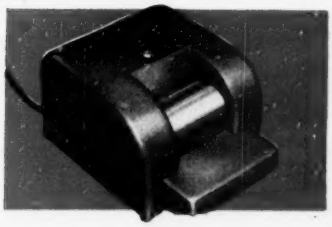
24-HOUR SERVICE—you get definite delivery information within 24 hours when you call your Carpenter Stainless Tubing Distributor. Complete stocks also carried by Cherry-Burrell branches.

For Myers, this Heat Seal Label Paper Sticks to Aluminum Foil at —20°F!

Here's another outstanding performance — appearance story by Pervenac* — Nashua's revolutionary label paper. Bucks County Dressed Poultry Co., Plumsteadville, Pa., pack their frozen meat and poultry in Reynolds Pak Aluminum Trays — smart, sales-building packages every one — *including the labels.*

Mr. Myers, Proprietor, writes: "Just a line to inform you of the satisfactory results we are having with your heat seal label stock. We have been using it for some time for all of our labels that have to be frozen at temperatures of −20°. We run the labels through a Pervenactor machine at high temperature, they are applied to the package and then are placed in the −20° freezer room for 6 to 24 hours. We especially like this type of label because it is very quickly applied, is not at all messy and sticks to the aluminum tray paks better than any other label we ever used."

Do *you* want no-curl, no-wrinkle, no-drop-off labeling to foil, film, metal, glass, paper, plastics? Write Nashua or your nearest Pervenac distributor.



Bucks County Dressed Poultry Co. uses the Pervenactor (Trade Mark), Nashua's Portable Hand Activator. It's ideal for "stop and go" and problem labeling. Activates Pervenac labels up to 4 inches in width. With it a single operator can activate and apply large, small and intermediate sized Pervenac labels.

It's Pervenac on foil for a positive bond, quick identification, added good looks.

*Trade Mark
Manufactured under patent 2,462,029

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NASHUA, NEW HAMPSHIRE

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MAKES PAPER MAKE MONEY FOR YOU

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American Paper Exports, Inc.
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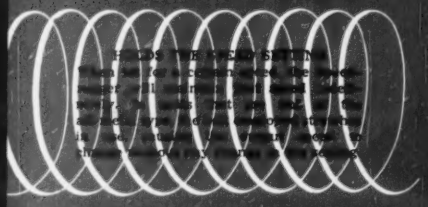
I. J. Soper, 65 Ave. Niel, Paris

LUBRICATION IS NO PROBLEM
Since the Speedranger runs in oil, the bearings and all moving parts are lubricated automatically. This is possible only with an all-metal construction.



HIGH SPEED OPERATION
The Speedranger furnishes smooth, stepless operation to 2,000 or 3000 R.P.M.

On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

Master Speedrangers provide all these advantages inherent to variable speed operation. And in addition their ALL-METAL construction gives you the five additional advantages illustrated on this page . . . advantages that can be obtained only with an all-metal unit.

CUTS MAINTENANCE
The steel on steel construction insures longer service than can be expected from units in which less durable parts are used.

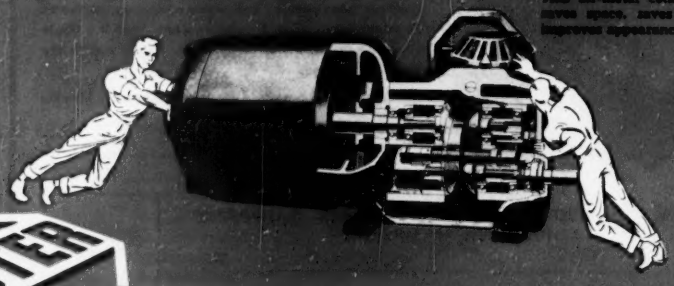
ALL METAL CONSTRUCTION

don't overlook these 5 advantages of

The next time you need a drive for material processing, handling, and conveying equipment; mixers and agitators; welding-positioners; machine tool drives; testing and calibrating equipment . . . to name only a few . . . see what a really remarkable job Master Speedrangers can do for you. Write for Data 7525, new booklet on Speedrangers.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

COMPACT DESIGN
This all-metal construction saves space, saves money, improves appearance.



MASTER SPEEDRANGERS

get the facts straight

You'll never have to alibi for stainless if you have the facts straight about its proper applications. It's easy to regard stainless as capable of "miracles", as users of stainless are apt to do. But stainless is more than *one* type of material, it is a whole family of specialty steels available in a range of grades, sizes and finishes. Crucible, pioneers in the development of stainless steels, knows that stainless will live up to its reputation *only* when the right analysis is used.

That's why Crucible makes freely available to you an alert metallurgical staff to help you find the right stainless for your application. The best way to find out if stainless can work its "miracles" in your application is to check with Crucible. Take full advantage of our fifty years of specialty steel experience. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

CRUCIBLE first name in special purpose steels

STAINLESS STEELS

fifty years of Fine *steelmaking*

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

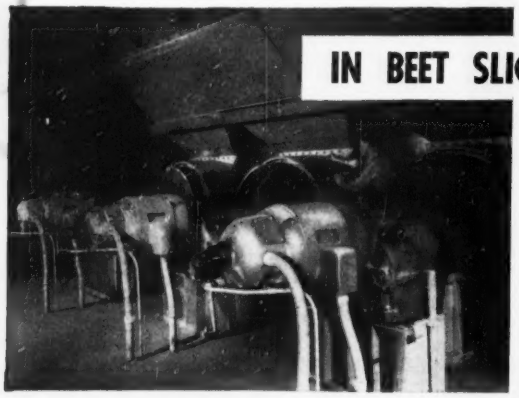
how 3 food plants cut costs with G-E adjustable-speed drives

You, too, can get more out of your machines with the right adjustable-speed drive from the complete G-E line!

Here are just three food processors who turned some perplexing problems into profitable production by coming to General Electric —headquarters for electric adjustable-speed drives. And here's the moral:

To meet *your* specific needs, General Electric recommends only the *right* adjustable-speed drive. Here is the broadest line of its kind—*sure* source for the *right* speed for *every* job!

A G-E food industry specialist will gladly help you apply adjustable-speed to get more out of your machines. Call him at your nearest G-E office, or send the coupon for more data. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

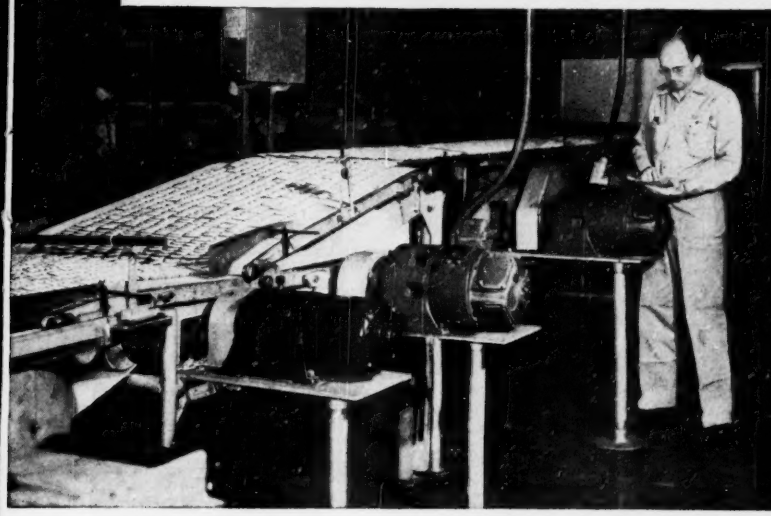


IN BEET SLICING—OUTPUT KEPT HIGH!

One of the nation's largest beet sugar factories—the Moorhead, Minn. plant of the American Crystal Sugar Co.—uses these three G-E Tri-Clad ® 50-hp wound-rotor a-c motors to provide adjustable speed in slicing beets. Individually controlled, they drive the beet-slicers at most efficient speeds for an average output of 50 tons per hour each. G-E wound-rotor motors are a low-cost choice for simpler jobs where limited speed adjustment and wide speed regulation are permissible. Also available are G-E adjustable-speed d-c motors for food plants already equipped with a d-c distribution system.

GENERAL ELECTRIC

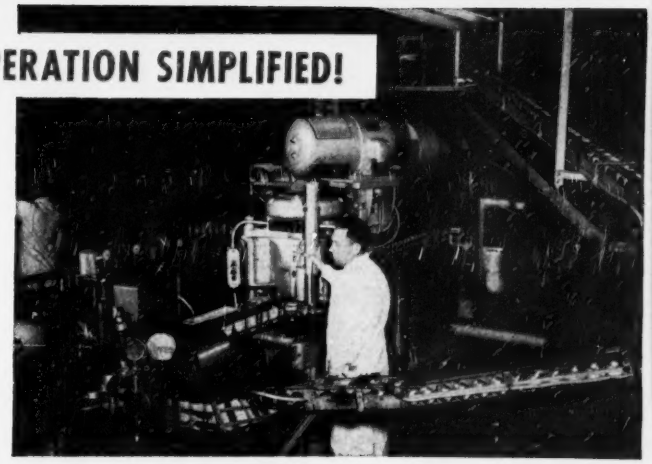
IN BISCUIT BAKING—PRECISION CONTROL ASSURED!



On a 600-foot continuous biscuit-production line at the Keebler-Weyl Baking Co. of Philadelphia, 26 G-E Thy-mo-trol® drives closely co-ordinate individual machine speeds. Rated ½ to 7½ hp, they keep the entire line in step, and help maintain plant cleanliness. In addition to ultra-accurate and versatile Thy-mo-trol, G-E packaged adjustable-speed drives also include speed variators and electronic speed variators.

IN BEER CANNING—OPERATION SIMPLIFIED!

"Make Mine Ruppert" and "Make Mine ACA" are synonymous slogans at the Jacob Ruppert Brewery in New York, where a conveyor system to process cans through filling and capping machines is driven by a 10-hp G-E Tri-Clad ACA motor. To vary output from 105 to 315 cans per minute — formerly done by manually adjusting a belt—finger-tip dialing now produces instant speed changes. Operating on a-c power without conversion equipment, ACA motors give stepless speed control over ranges up to 20 to 1, in ratings from 3 to 75 hp. Also available, in ratings from 1 to 15 hp and up, are ACA gear-motors for low adjustable speeds.



WANT MORE DATA?

General Electric Company, Section 652-6
Apparatus Department, Schenectady 5, N. Y.
Please send me the following bulletins:
(V) for reference purposes
(x) in connection with immediate project

( ) GEA-4883—ACA Motor
( ) GEA-5334—Adjustable-speed manual
( ) GEA-5335—Speed Variator
( ) GEA-5336—Electronic Speed Variator
( ) GEA-5337—Thy-mo-trol Drive

NAME_____
COMPANY_____
STREET_____
CITY_____ STATE_____

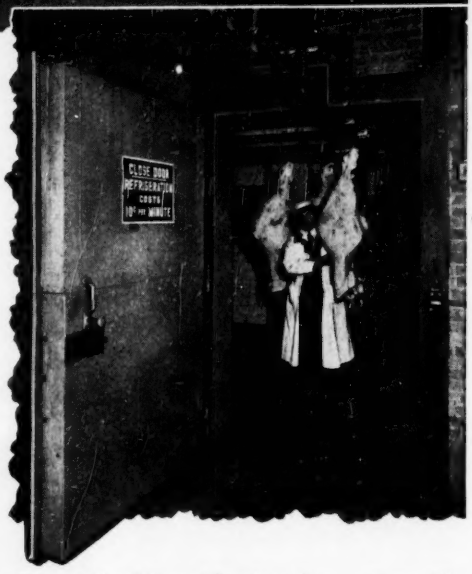
JAMISON DOORS *at work for a meat packer*

AT TOBIN PACKING CO., INC., ALBANY, NEW YORK

TRACK DOORS SPEED HANDLING— SAVE REFRIGERATION

Fast movement of material in and out of the refrigerated space by monorail is possible with Jamison Track Doors which permit free passage of the trolley. The Jamison freezer doors illustrated are not only metal clad but they have an additional metal kick plate on the bottom to protect against possible battering from trucks.

An unusual feature of this installation is the all-steel frame in which the door is hung. The three E-Z-Open Fasteners assure uniform gasket compression for a good seal all around.



JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

The oldest and largest builder of cold storage doors in the world

The standard line of Jamison doors will meet the majority of user requirements for temperatures, dimensions, applications.

For detailed information on these and other Jamison Cold Storage Doors, request Catalog 175.

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U. S. A.

Neptune Meters are made for men who are hard-boiled about profits and losses in liquid processing operations. Accurate Neptunes substitute unerring precision for the element of human error. They stop spoilage, spillage, and underfilling. They work fast—no slow weighing or batch tanks. Fine-instrument accuracy gives you constant control over product quality—and also keeps close watch over inventory.

They boost good house-keeping, too. Simple, easy to clean, they keep messy or hazardous liquids inside the pipe. Many types now available for handling more than 100 different liquids—including the new "432" push-button Auto-Stop for automatically feeding water and liquid sweeteners to batching or blending. Composition bronze. Sizes ⅝" to 6", for rates to 600 gpm. Easy to read, easy to operate, easy to calibrate, and easy to service with interchangeable parts. For quick facts, just use the coupon. Or phone the nearest Neptune branch.

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We're interested in metering
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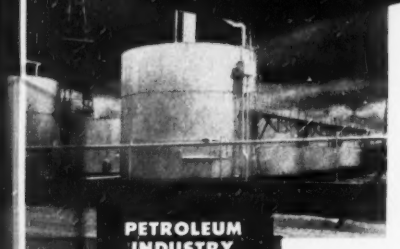
CORROSION PLAYS NO FAVORITES

CHEMICAL INDUSTRIES



PETROLEUM INDUSTRY

You must PROTECT *or* PAY
...you have no other choice

No business escapes the effects of corrosion. It costs industry over $6,000,000,000.00 annually. Yet much of this costly damage might be avoided by taking just two simple steps—

1. Check the danger points in your plant—manufacturing equipment, piping, valves, tanks, motors, and all similar items.
2. Protect them with Amercoat—the corrosion-resistant coatings; each designed to meet specific conditions.

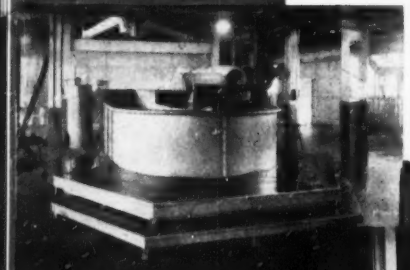
Most conventional coatings fail when corrosion threatens, because they are neither designed nor suited for severe service. Don't risk needless loss—protect now with Amercoat.

MEAT PACKING

AMERCOAT CORPORATION

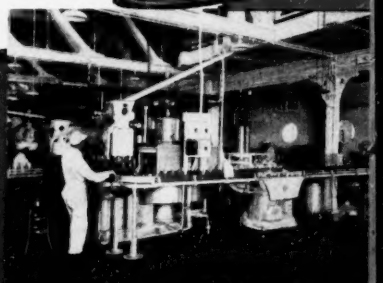
A Division of
American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

FOLLOW THE LINE OF most RESISTANCE



PAPER MILLS

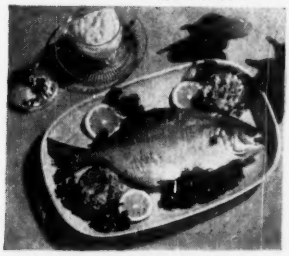
RAYON MANUFACTURING



BEVERAGE PLANTS

NOW! "Fresh Flavors" Can Be Locked In Processed Foods!

IN SOUPS



IN FISH

IN MEATS

IN VEGETABLES

ZEST
MONOSODIUM GLUTAMATE

Let Us Prove How ZEST Staley's Monosodium Glutamate Seals in Original Food Flavor!

Equally Effective Before or After Processing!

At last, there is a way to recapture that elusive *fresh flavor* which is often lost during food processing! Frozen, dehydrated, or canned . . . your finished product gets an amazing flavor boost with the addition of a small amount of ZEST! Prove to yourself in seconds how this 99+% Pure Monosodium Glutamate will improve the taste appeal of your foods.

No Formula Changes—No Trouble!

ZEST adds no color, taste, or aroma of its own—it simply magnifies the natural goodness in the foods in which it is used. As little as 0.05 to 0.5% by weight works miracles in canned soups, canned poultry, seasonings, sauces and most other foods. It requires no formula changes . . . it's as easy to use as salt.

Tiny Crystals Dissolve Instantly!

Try it with your own products . . . taste them the way they are now; then taste them with ZEST added! You'll notice the surprising difference immediately! Our food technicians and research staff are ready to give you specific recommendations on your products.

A. E. STALEY MFG. CO., Decatur, Illinois

Get Your Free Flavor Test Kit Now!

A. E. STALEY MFG. CO.
Dept. FG-9, Decatur, Ill.

Gentlemen:
Rush me your free test kit so I can prove to myself the profit miracle that ZEST Flavor-Improver can perform for my products.

Name _____ *Title* _____

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CHEVROLET

The World's Most Popular Engine!
More truckers use Chevrolets than any other make. And one important reason is Valve-in-Head engine design. For 38 years Chevrolet has been the largest producer of valve-in-head engines — engines world famous for power, dependability and outstanding economy.

Lower Cost per Mile! Chevrolet's Valve-in-Head Loadmaster engine and Chevrolet's greater horsepower at the clutch add up to important advantages to truckers. They mean greater efficiency—they mean *bigger payloads at lower cost per mile!*

Better Buy . . . Better Resale! Low first cost coupled with dependability and economy make Chevrolet trucks *the buy.* Chevrolet trucks have led in demand and sales for the last eight consecutive truck production years . . . are far ahead this year, according to current registration figures. Here is proof of greater owner satisfaction . . . satisfaction which has made Chevrolet's higher resale value traditional across the nation.

Chevrolet Trucks
CUT YOUR COSTS ON EVERY HAUL!

Chevrolet heavy-duty trucks with Loadmaster engine actually deliver *more horsepower at the clutch* . . . more *net* horsepower—proved by certified ratings on engines used as standard equipment in conventional models of the five most popular makes, 13,000 to 16,000 lbs. G.V.W.* Here, then, is power to *move* big payloads . . . in a truck with strength to *carry* big payloads . . . and these add up to outstanding, all-around efficiency. You save on gas, oil and upkeep, cutting your costs on every haul! See your Chevrolet dealer—get the full story of Chevrolet leadership. **Gross Vehicle Weight*

CHEVROLET MOTOR DIVISION, *General Motors Corporation*
DETROIT 2, MICHIGAN

PLUS—Chevrolet Advance-Design Truck Features!

TWO GREAT VALVE-IN-HEAD ENGINES: the new Loadmaster and the improved Thriftmaster—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

increased equipment service

reduced operating costs

with TRENTWELD beverage tubing

TRENTWELD features that meet your needs!

- Stays bright and clean, inside and out
- No possible taste effect
- No possible toxic effect
- Readily flattens, flares, flanges, coils
- Available in sizes for your application
- Neatly packed for your convenience

More and more manufacturers and users of brewery equipment are finding that modernization with TRENTWELD Stainless Steel Beverage Tubing is a direct means for cutting costs and keeping production lines running smoothly. TRENTWELD in tap rods, cooling coils, beer lines . . . is daily performing exceptional service in hundreds of brewery applications.

TRENTWELD Beverage Tubing is made in a *tube* mill by *tube* engineers who roll and weld stainless and high alloy tubing *exclusively*. That means you're assured quality tubing to meet your strictest requirements. And you get delivery on time because of Trent's convenient mid-continent location.

Then too, alert Trent metallurgists are freely available to you to help you put TRENTWELD to work in your brewery application. Start cutting your operating costs by calling in Trent. Write for your copy of the TRENTWELD DATA BULLETIN.

TRENTWELD

TRENT TUBE COMPANY
Subsidiary of Crucible Steel Company of America
General sales office and plant – East Troy, Wisconsin
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STAINLESS STEEL BEVERAGE TUBING

WHAT THE PIONEER ICE CREAM DIVISION OF THE BORDEN COMPANY SAYS ABOUT *LIQUID SUGAR*

We pride ourselves on the high quality of our ice cream. And since sugar is such an important ingredient, we were among the first users of Flo-Sweet in the industry. We are pleased by the sanitation achieved by the liquid sugar installation Flo-Sweet engineers made nearly a quarter of a century ago, for we feel it has materially reduced the incidence of contamination from this source.

Pioneer Ice Cream Division
The Borden Company

FLO-SWEET LIQUID SUGAR ENDS SUGAR CONTAMINATION PROBLEMS

Time after time, in plant after plant, Flo-Sweet users' experiences prove that they save time and money—and worry—by relying upon this modern way to get *pure* sugar into the mix.

3 EASY MECHANICAL STEPS REPLACE 10 COSTLY MANUAL OPERATIONS

Not a finger touches Flo-Sweet! No bags lie around inviting dirt and animal impurities. No handling—no shaking out over the mix! Crystal clear Flo-Sweet Liquid Sugar flows from our specially constructed tanks and delivery equipment into yours, flows from your tanks directly into the mix through sanitary, sealed pipe lines.

WE TAKE PAINS WITH OUR PRODUCT TO MAKE YOUR PRODUCTION PAINLESS

- Because we have pioneered and specialized in this one field, our plant is unsurpassed in its facilities for producing and delivering clean liquid sugar.

Centrifugal Purification—The latest, high-speed centrifugals completely separate impurities from the crystals in raw sugar.

Improved Defecation—All sugar liquor passing through our refinery is defecated by an improved method for increased purity.

Char Purifications—By both bone-char and vegetable-char treatment. This brings Flo-Sweet Liquid Sugar to the peak of quality.

Control Laboratories—Various plant control laboratories constantly check on the quality and purity of Flo-Sweet.

- Flo-Sweet is delivered in tank-cars, tank-trucks and tank-ships especially designed for this purpose.
- Flo-Sweet delivery men are specially schooled in loading and discharging our liquid sugars cleanly and efficiently.
- You may always inspect our production and distribution facilities.

When you get Flo-Sweet, you get sanitation backed by 27 years of successful liquid sugar development and production. Therefore, you get more product improvement, more product control and always-dependable sanitation and service.

flo-sweet

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 7, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, **SANITATION** AND SERVICE

A New Taste Treat

blackberry and raspberry syrup

processed in Stainless Steel to preserve that "just picked" berry flavor

Delicate flavor esters are guarded carefully by Stainless Steel in these 100-gallon steam-jacketed kettles. The kettles are fabricated by Groen Manufacturing Company, Chicago.

BERRY PROCESSING TIME is Stainless Steel time at Farmers Union Berry Cooperative of Puyallup, Washington. In this plant, where blackberries and raspberries are processed into a flavorful syrup for waffle and pancake topping or for flavoring ice creams, puddings, etc., Stainless Steel guards the fresh, natural flavor of the berries, speeds production all along the processing line.

In processing, juice of the crushed berries is collected in a Stainless Steel tray and is channeled out into 3-gallon containers. These containers are emptied into 100-gallon capacity steam-jacketed Stainless Steel kettles. Here the other ingredients are added and the batch is heated—long enough and hot enough to pasteurize the product and eliminate excess water. The hot syrup then is discharged into an elevated steam-jacketed holding tank, and from there into the final containers.

For processing viscous foods like this —or for processing *any* food products which must be protected from metallic contamination and loss of color and flavor—Stainless Steel is the ideal material to use. It resists the corroding action of fruit juices, meat, vegetables and dairy products. It protects the purity and wholesomeness of the food. It is easy to clean . . . easy to keep permanently lustrous and good-looking. And because Stainless Steel is so highly resistant to corrosion, wear, and heat, plant down-time for equipment repairs is practically eliminated.

Put these advantages to work for *you* . . . specify Stainless Steel for your processing equipment. Its long-term economy more than offsets any extra initial cost. And when you order, be sure that your fabricator uses perfected, service-tested U·S·S Stainless Steel. Available in a complete range of forms —sheets, strip, plates, bars, wire, pipe, tubing and special sections, as well as a variety of compositions and finishes—U·S·S Stainless Steel offers the widest latitude in design and enables the fabricator to use the most modern fabricating methods.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

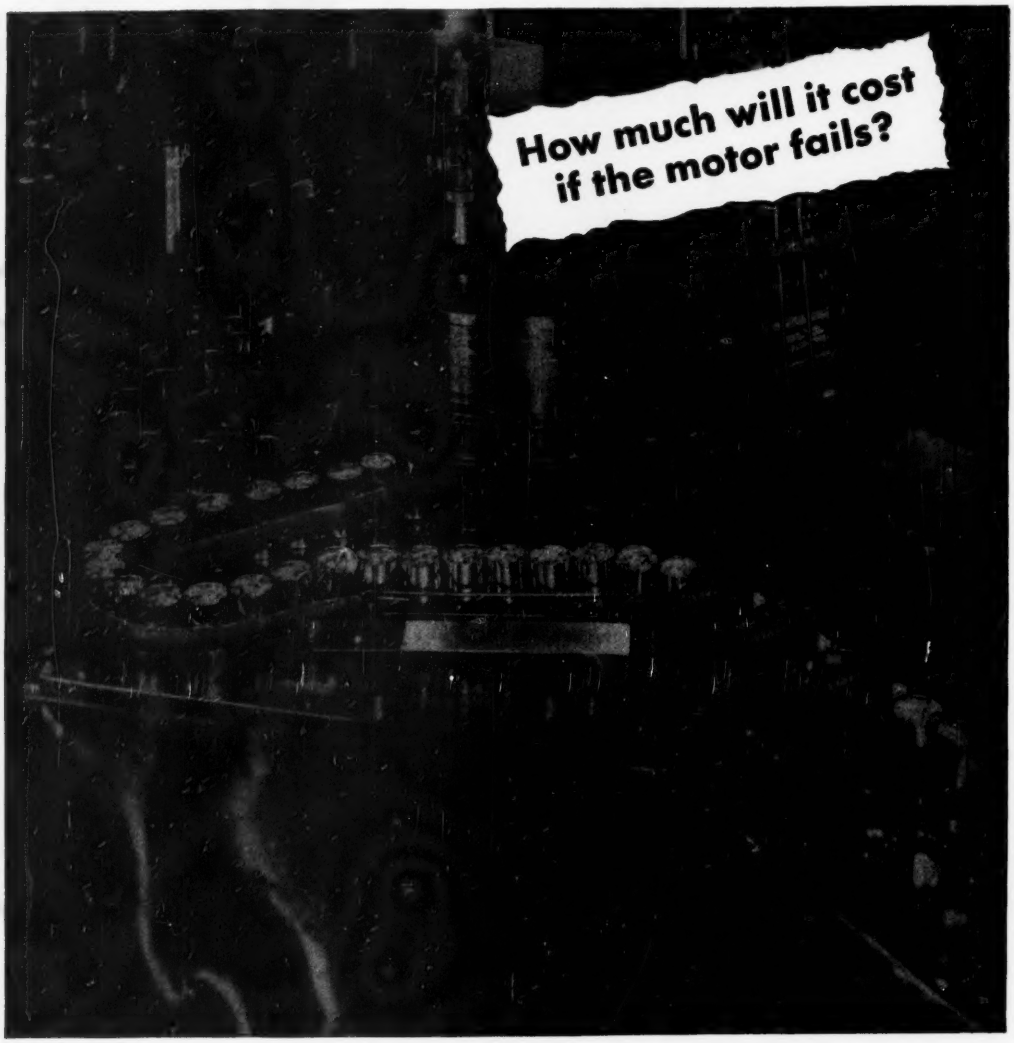
U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

0-1567

UNITED STATES STEEL

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



HERE'S THOUGHT FOR FOOD

When a production line goes down in a food plant—costs skyrocket. Spoilages alone can add up to a $1000 an hour. And the down time may all be caused by one motor outage. Isn't that food for thought?

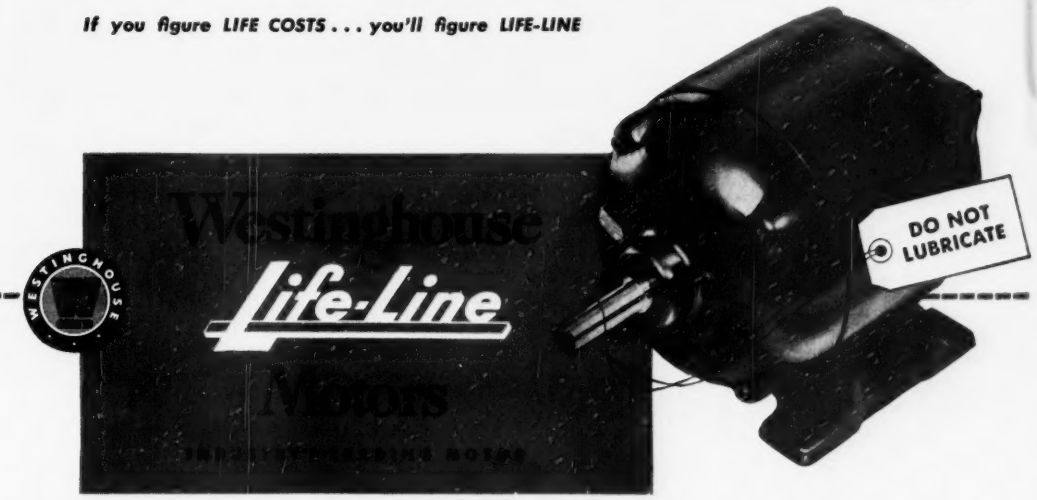
Take just a minute, then, to consider what a Life-Line can mean to your production line. Its extra "Life" features have the stamina to keep your equipment operating even under adverse conditions.

For example: Life-Line's heavy all-steel frames, brackets and feet, guard against physical shocks . . . against accidental blows. Pre-lubricated bearings eliminate faulty lubrication . . . save the time and cost of constant greasing attention. Stator windings—of Tufvar wire, extra-protected by multiple dips and bakes in Thermoset varnish—cut outages from oil, moisture, dirt and heat. In fact, records of nearly half a million Life-Line motors show an on-the-job performance—twice as good as the best motor built by Westinghouse in 58 years. That's a record of performance that is hard to beat—one that will certainly pay off on your production line.

And, important too, is the fact that Life-Line motors offer a complete line. Dripproof, splash-proof, totally-enclosed, fan-cooled and sanitary motors that meet 3-A specifications. Ask your Westinghouse representative for a presentation of the sound movie, "What Price Motors" and booklets B-4321 and B-3842, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

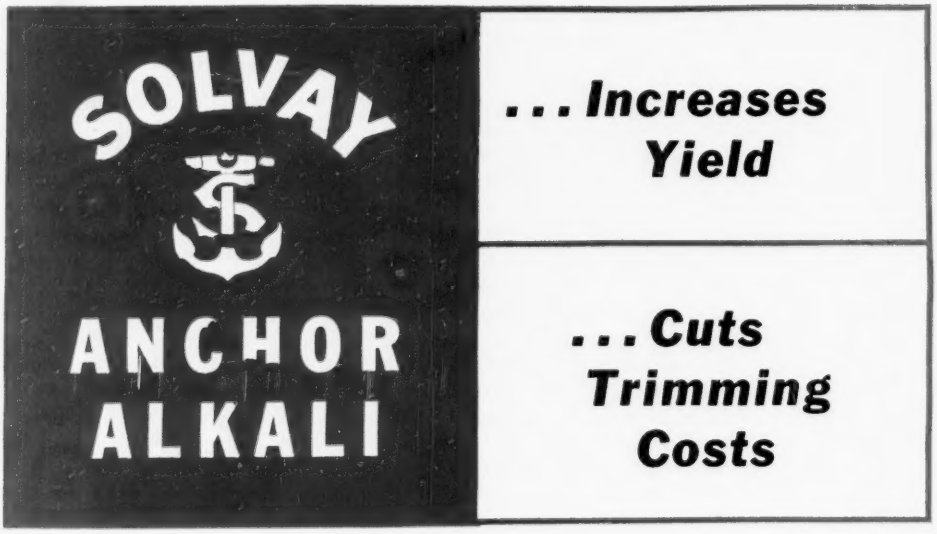
J-21562

If you figure LIFE COSTS . . . you'll figure LIFE-LINE



For Better LYE PEELING of FRUITS and VEGETABLES

Use . . .



For Peaches
Pears
Figs
White Potatoes
Sweet Potatoes
Carrots
Beets

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit • Houston
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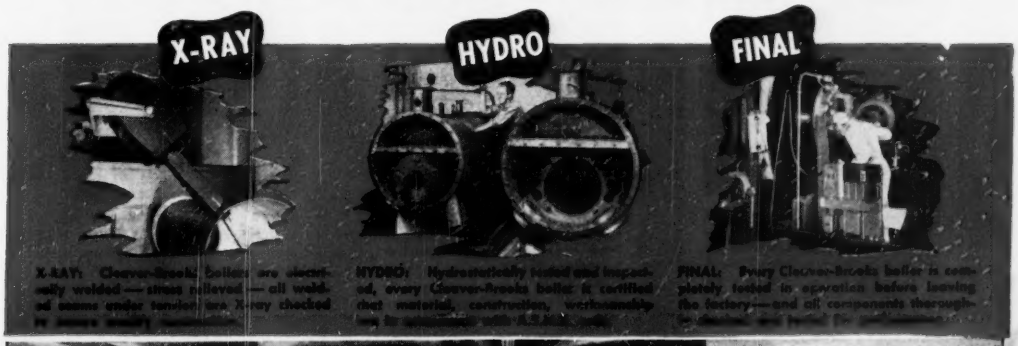
Soda Ash • Caustic Soda • Caustic Potash • Chlorine • Methanol
Potassium Carbonate • Calcium Chloride • Sodium Bicarbonate
Specialty Cleansers • Sodium Nitrite • Nytron • Ammonium
Bicarbonate • Para-dichlorobenzene • Ortho-dichlorobenzene
Monochlorobenzene • Ammonium Chloride • Formaldehyde

FACTORY-TESTED AND JOB-TESTED

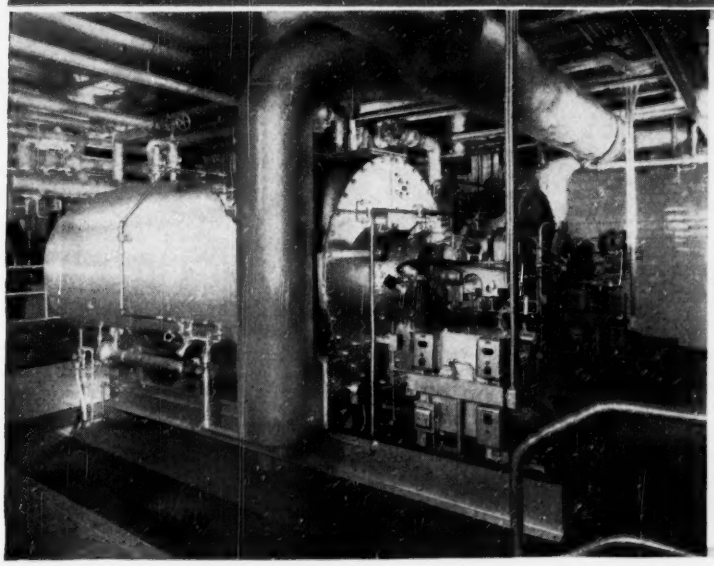
. . . Another Reason Why You Get A Greater Return From Your Investment In A Cleaver-Brooks Steam Boiler



X-RAY: Cleaver-Brooks boilers are electrically welded — stress relieved — all welded seams under surveillance of X-ray checked by trained inspectors.

HYDRO: Hydrostatically tested and inspected, every Cleaver-Brooks boiler is certified that materials, construction, workmanship has been satisfactorily met.

FINAL: Every Cleaver-Brooks boiler is completely tested in operation before leaving the factory — and all components thoroughly checked and tested for performance.



Performance on Location:

Boilers are placed in operation by Cleaver-Brooks service representatives who check installation, operation and make a complete and detailed field report. Your operators are trained in care and operation by Cleaver-Brooks.

Exact and detailed testing—progressively—at successive stages in manufacturing and assembly—operation tests under load at the factory — plus final operation test on location in your plant — these are standard Cleaver-Brooks procedures to assure you in advance of peak performance.

Flexible Operation Burning Gas or Oil With Equal Efficiency: You can use oil, gas, or combination oil and gas, whichever is of lower cost. Through high heat transfer, Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating.

In addition, Cleaver-Brooks boilers give you clean, smokeless operation—eliminate fuel—ash handling —require no high or costly stacks—no special foundations — fit under low headroom—provide quick steaming, flexible operation to meet fluctuating loads—fully meet all codes.

Available in sizes 15 to 500 H.P., 15 to 200 P.S.I. — write for new Cleaver-Brooks steam boiler catalog.

CLEAVER-BROOKS COMPANY, 327 E. Keefe Ave., Milwaukee 12, Wis.

Cleaver-Brooks

STEAM BOILERS

NEW — the Cleaver-Brooks Steam Boiler Catalog—interesting—informative—beautifully illustrated. Write—on your business letterhead—for your copy.

THE BOTTLE THAT'S GOING PLACES

SKOL MAKES THE SUN a gentle skin specialist . . . converts sun-burners into sun-worshippers. And now it's packaged in the unbreakable Plaxpak bottle. Lighter and safer to pack and carry, the Plaxpak bottle makes Skol more convenient than ever to use.

UNBREAKABILITY AND INERTNESS to hydrofluoric acid make the Plaxpak bottle a super-convenient container for Johnson Chemical Industries' Rust-E-Lim, a rust stain remover used in the laundry and dry cleaning industries. Insert plug emits thin stream.

NEL, AN ANTISEPTIC POWDER, by Beck Products, Detroit 19, Mich., is sprayed on with just a squeeze of the Plaxpak bottle. Users will like the way they can apply the antiseptic accurately and gently on cuts, poison ivy and other skin irritations.

ANTS IN YOUR PLANTS? Spray-Away kills 'em quick. Just squeeze the unbreakable Plaxpak bottle and out comes a mist of sure death for bugs. Self-atomizing bottle is always handy. Spray-Away is product of the Bulb of the Month Club, Chicago 90, Ill.

REVOLUTIONARY NEW "ROTUBE TWISTUBE" combines advantages of a rigid jar and collapsible metal tube. User twists bottom of the container. Inner sack of Plaxpak polyethylene film forces a measured amount of cream through an orifice at the top.

NOW THE HOUSEWIFE has Plaxpak polyethylene film in rolls. From her own experience, she knows that products are better protected in Plaxpak. It's quite natural that she will have preference for those products because she will know they are packaged well.

★ In addition to its packaging products, Plax makes a wide variety of thermoplastics in rod, sheet, tube, and other forms.

There's good reason for the Plaxpak bottle's steadily growing acceptance. It's unbreakable — safe everywhere with everyone. It provides controlled dispensing — new neatness and convenience in product use. It's light — a perfect traveler. It's colorful and quiet. The public appreciates these plus values and wants them. Your product should have them. So investigate the Plaxpak bottle now — a catalog is yours for the asking.

PLAX BLOW MOLDED PRODUCTS ARE MADE UNDER THE FOLLOWING U. S. PATENTS 2178239, 2175053, 2175054, 2230188, 2230190, 2260750, 2263751, 2349176, 2349177, 2349178

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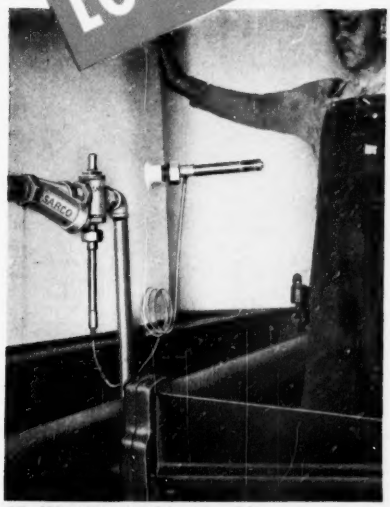
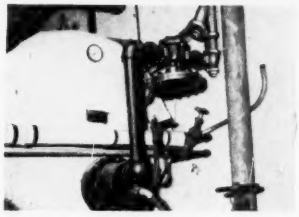
Offices in New York City, Syracuse, Philadelphia, Cincinnati, Chicago, St. Louis and Houston

LOW COST *Insurance*

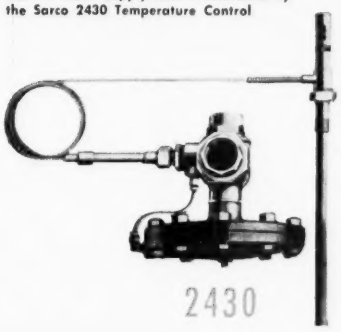
FOR HIGH COST OILS WITH SARCO TEMPERATURE CONTROL

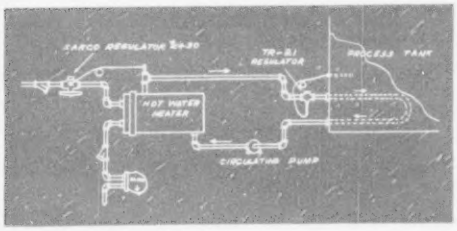


AT SPENCER-KELLOGG CO., Edgewater, N. J.



The hot water supply tank is controlled by the Sarco 2430 Temperature Control





The edible oils processed in this plant discolor or scorch only a few degrees above their melting points which range from 77° on cocoanut oil to 105° for soy bean oil. How to protect the several hundred thousand dollars worth of oils in these eight tanks, all requiring different temperatures, was the problem.

Sarco engineers studied the job and recommended hot water as the heating medium instead of steam. By keeping the heating coil surface just hot enough, but not too hot, scorching the oil is prevented but output maintained. Each tank is controlled by a TR-21 regulating the hot water flow and a 2430 controls the hot water supply temperature.

RESULTS: What was a constant worry to both management and the operators is now a 24 hour security. There is no possibility of discoloring because of too much heat, nor of caking because temperatures are too low. The human element is eliminated as a source of error — and of course, the tanks use less heat.

FOR YOUR TANKS: There are many combinations of Sarco Steam Traps and Temperature Controls for open and closed tanks, indoors or out. It costs nothing to find out what this kind of insurance would cost.

TR-21 TEMPERATURE REGULATOR

Each of the eight tanks is individually controlled by a Sarco TR-21

SARCO PIPE-LINE STRAINERS

Sarco self-cleaning pipe line strainers are placed ahead of each control

301

SARCO SAVES STEAM

SARCO COMPANY, INC.

Represented in Principal Cities

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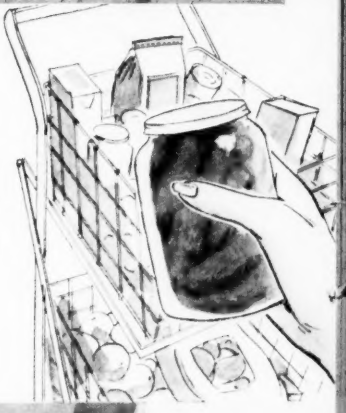
SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

Salt-

the



at point of sale . . they're ALWAYS clean

NO LEAKERS, NO MESSY LABELS, NO MOLD DAMAGE

Stock or Sterilized

ALL need "VAPOR-VACUUM"*

Two years ago we said to the pickle packers of America:

"A radical change is coming in pickle packaging! A great idea is now taking root and spreading fast . . . This new idea is nothing more or less than complete standardization on Vapor-Vacuum sealing for the entire pickle line, salt-stock or sterilized."

Today this prediction has been amply fulfilled. Vapor-Vacuum's recent gains in the pickle industry have been the greatest in Vapor-Vacuum history—and the rate of increase is still growing.

• • •

Timely, then, is this brief re-cap of the reasons for our statement of two years ago—reasons which are still just as valid and just as vital as they were then.

The essence of the situation is the fact that *ALL pickles need the same kind of product protection*—protection that insures all the original freshness and flavor—the kind that only Vapor-Vacuum can give.

The notion that a brine pickle can take care of itself without vacuum packaging no longer holds good. For, even though salt stock is inherently self-preserving, the quality-conscious consumer of today will no longer accept the misbehaviour common to pickle packages which have no vacuum protection.

Consumers, today, are reluctant to accept brands with caps which are frequently "frozen" to the jar. Consumers hesitate to buy brine-smeared packages. But whenever an ordinary cap is used on pickles, these mishaps (and others, too) are all too common.

The change-over to Vapor-Vacuum sealing becomes a necessity when these facts are recognized. And this change-over becomes all the more advisable when the production speed and economies of Vapor-Vacuum are considered.

• • •

On *sterilized pickles*, of course, the overpowering advantages of Vapor-Vacuum have long been recognized by most packers. Here some type of vacuum packaging is a virtual necessity. Hence, Vapor-Vacuum's production economies alone (not to mention all the other advantages) make this seal the obvious choice.

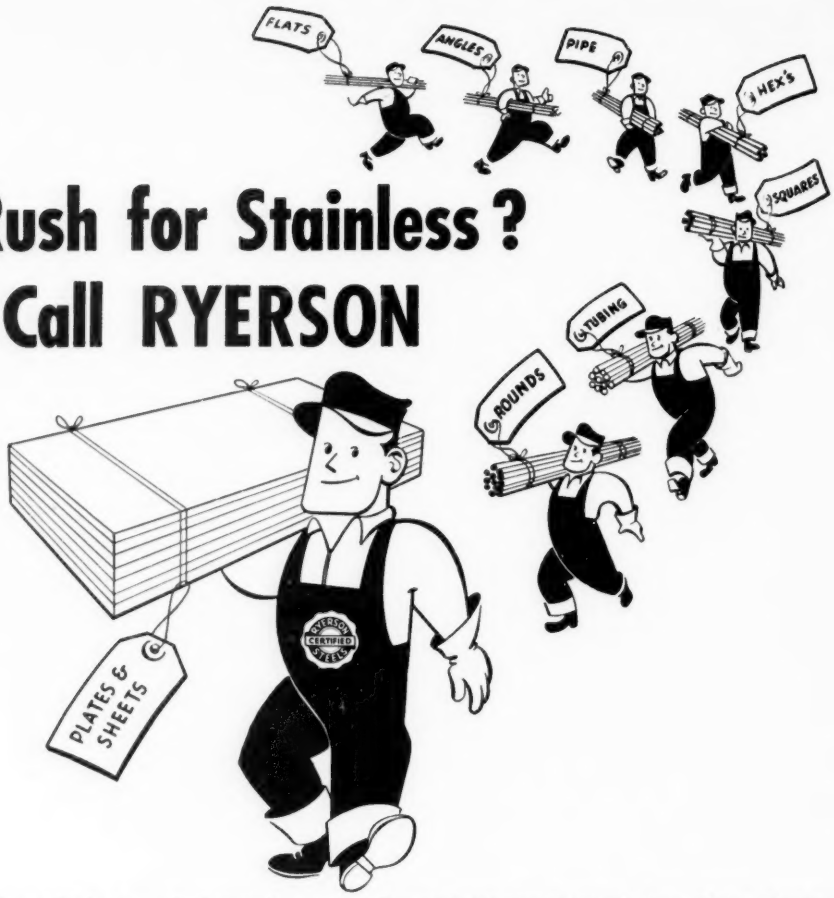
Because of these established facts, it is easy to see why Vapor-Vacuum is *a full line necessity* for pickles—and why so many packers are acting accordingly.

WHITE CAP COMPANY, Chicago 39, Illinois

*T. M. Reg. U. S. Pat. Off.

in the kitchen..they ALWAYS open up fresh

CRISP AND GOOD AS THE DAY THEY WERE PACKED



In a Rush for Stainless? ...Call RYERSON

Time-tested Allegheny Stainless—all shapes in a wide range of analyses and sizes—awaits your call at your nearby Ryerson plant. And with the stainless you order from Ryerson goes the services of experienced stainless experts — men who will gladly advise you on how best to fabricate and apply this long-lasting, heat and corrosion-resistant metal.

Our stainless stocks include bars, plates, sheets, tubing, pipe fittings — virtually every stainless product to meet every requirement of the food industry. More than a quarter of a century of stainless experience enables us to offer you reliable assistance on any stainless problem.

For quick stainless shipments—*complete* stainless service, call Ryerson for Allegheny Stainless—pounds or tons.

OTHER RYERSON PRODUCTS

BARS—Carbon & alloy, hot rolled and cold finished

STRUCTURALS—Channels, angles, beams, etc.

SHEETS—Hot & cold rolled, many types

SHAFTING—Cold finished, ground & polished, etc.

PLATES—Many types including Inland 4-Way Safety Plate

TUBING—Seamless & welded mechanical & boiler tubes

Babbitt Metal—Ryertex composition bearing—Machinery & tools, etc.

RYERSONSTEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

SEPTEMBER, 1950

Food Industries

Food Market Map Changed by 1950 Census Data

"Am I getting my share of business in the major food markets of the United States?" That is a question every food processor should ask himself, now that the new U. S. census figures have been issued. The census tentatively puts the population at 150,520,198, up about 12½ percent over 1940.

This increase, together with 10 percent higher per capita consumption—plus high average consumer incomes—paints a very nice market picture for food processors.

But the data go further than that. They reveal in certain areas population growths so large as to significantly change the food market map.

Executives and marketing specialists must re-evaluate regional sales potentials against this map. And they must consider not only the number of mouths to be fed, but types of processed foods favored by the nationalities represented, as well as the buying power of people in each area. They also should restudy each phase of marketing operations —transportation, storage, distribution channels, sales promotion and advertising. It's a big job, but a rewarding one.

The importance of this re-evaluation procedure is made apparent when one considers the magnitude of the population changes. California gained no less than 3,564,961 food consumers between 1940 and 1950. But have your sales in that state increased as much as the potential? And the same question goes for several other states. Here are those in which population has gone up a million or more: Michigan, up 1,078,066; New York, 1,264,068; and Texas, 1,262,236. Increases of a half-million or more have occurred in these states: Florida, up 836,672; Illinois, 799,249; New Jersey, 661,715; Ohio, 994,179; Pennsylvania, 535,785; Virginia, 570,008; and Washington, 625,070. Three more states show gains nearly as large: Indiana, 493,108; North Carolina, 436,227; and Oregon, 420,564.

Percentage-wise, the greatest gains were in California, 51.6 percent; Arizona, 48.7; Florida, 44.1; Nevada, 43.7; Oregon, 38.6; Washington, 36.0; Maryland, 27.5; New Mexico, 27.3; Utah, 24.8; Virginia 21.3; Michigan 20.5; and Texas, 19.7.

Population increases have rearranged the order of states by total population. The present big ten are New York, California, Pennsylvania, Illinois, Ohio, Texas, Michigan, New Jersey, Massachusetts and North Carolina.

Food marketing executives and specialists, of course, will pinpoint their targets first by metropolitan areas and then by segments of those areas. So it is interesting to see how the big municipalities line up population-wise. Here are those with more than a million, representing 10 percent of the total population: New York City, 7,841,023; Chicago, 3,631,835; Philadelphia, 2,057,210; Los Angeles, 1,954,036; Detroit, 1,837,613.

A dozen other cities have populations exceeding half a million and constitute one-sixth of the entire food market: Baltimore, 939,865; Cleveland, 909,546; St. Louis, 852,253; Washington, 792,243; Boston 788,552; San Francisco, 760,439; Pittsburgh, 673,756; Milwaukee, 632,938; Houston, 593,600; Buffalo, 576,506; New Orleans, 568,407; and Minneapolis, 517,410.

Cincinnati has nearly half a million (499,749). And these seven cities have more than four hundred thousand: Seattle, Kansas City, Newark, Dallas, Indianapolis, Denver and San Antonio. Then 23 others have over 200,000 people.

Altogether, 106 cities exceed 100,000, and their combined population is about 44,000,000, or nearly three tenths of the total.

Incidentally, it is probable that recent population trends will continue for some years. Even a major war situation is not likely to alter them significantly, for it is noted that they developed during and following World War II.

So you not only should catch up with your markets, but should do a little forward planning in the same directions.

—F. K. LAWLER, *Editor*

Showing them how it's done and why

TRAINING through classroom, conference and correspondence methods has been in effect since 1916.

Swift Builds Its Own Men

—by getting them young and following through with fully coordinated employee-relations programs. Thus this packer has set—and constantly maintained—its enviable record of top caliber personnel

FRANK MULLIN
Public Relations Department,
Swift & Co., Chicago

"A progressive company is concerned with the welfare of its people."

This truism most clearly defines the attitude of Swift & Co. toward all of those who make up the organization.

What happens from the time a Swift prospect first applies for a job until, as an employee, he arrives at retirement age is a gradual process of developing his best talents; directing them into fields that will be mutually beneficial to the company and himself. This may sound like a reverse approach to what is popularly known as "employee relations." There are no side-shows of paternalism. There are no juke-box musicals to stimulate production. Yet, almost 20 percent of the 75,000 employees have been with the company 20 years or more. And service records of 40 years or more duration are commonplace.

There is no secret formula for welding a satisfactory kinship between the company and employees. It can be stated briefly: "Hire them young, select them carefully, teach them well, compensate them fairly, assure them opportunities for advancement, assist them in sickness and adversity, and provide a pension for their old age."

Such a procedure reduces mental stress and at the same time places emphasis on individual accomplishment. It is not new. In the early days of the company, G. F. Swift, the founder, and Mrs. Swift knew each of the employees personally and helped them solve their problems. It also was the custom of Mr. Swift to hold conferences on the front porch of the family home with foremen, department heads, and young men who wanted to learn more about the business. He soon learned the natures and abilities of each of his men and placed them where these abilities could best be used. Although the employee group long ago outgrew its front porch stature, accent on proper placement and training of the individual still prevails.

Employee relations at the company, for the purpose of this article, may be divided into three general fields: (1) Procurement and placement, (2) training, and (3) employee benefit programs.

Replacement Program

An organization of 75,000 employees with broad diversification and national distribution facilities is in need of constant replacements. About 500 retire on pension each year. These are people who have had many years of experience. Their places are filled by others who are coming up through the ranks. These retirements and normal turnover make it necessary to seek out qualified applicants each year and start them on their way up in the organization.

In line with the formula of "hire them young, select them carefully, and teach them well," the company prefers to develop leadership within the organization. Qualifications for employment include special interests that may be developed, but the greater emphasis is placed on character, personality, and ability to learn. "I can raise better men than I can hire" is one of the guiding axioms attributed to G. F. Swift.

"We follow the policy of promotion from within," says Harold F. North, Industrial Relations manager. "We prefer to develop our own men."

Over a period of years, the company has learned that the best sources for recruiting new employees with the desired qualifications are high schools

and colleges. These are highly competitive sources, because nearly every progressive company has employment interviewers contacting graduates, as well as school placement officers or vocations counselors. The "cream" of prospective talent is skimmed off early in the year. So, the personnel division, under the direction of E. H. Wagner, tries to establish a permanent relationship with good schools. The technic is to keep placement officers "sold" on Swift & Co. as a good place to work in the hope that students will look forward to a career there.

Next best source, according to Wagner, is among the friends and acquaintances of present personnel. The company has learned that, like "birds of a feather," friends of its successful employees are likely to be of similar type and temperament and thus compatible with the group, more reliable, and likely to find satisfaction in their work.

In addition, voluntary applications usually are a plentiful source of all types of employees, while the professional and trade organizations, advertising media, and employment agencies are best sources when seeking someone with special talents or qualifications.

Regardless of the source from which an applicant may be recruited, employment procedure is the same. Also, the procedure is relatively the same, regardless of the plant location or division of the business. In short, while each plant, branch house, and oil mill does its own interviewing and hiring, the system is set.

Handling Applicants

The first step in seeking a career with the company is to write or apply personally to any one of the units.

Each applicant is given a screening interview before he completes the application blank. The purpose is to examine briefly his scholastic record, experience, personality, and general appearance. This helps the company determine whether his qualifications should be considered further. Among college students, this interview often takes place on the campus. Company representatives visit colleges regularly about graduation time.

Next step is what the company terms the preliminary interview. It occurs after the applicant has completed his application. College men screened on the campus are invited to visit a Swift unit for their preliminary interview.

This time the discussion between the prospective employee and the company representative goes thoroughly into the applicant's qualifications. From it the company hopes to obtain an answer to this question: "Is he the type of man we thought him to be?"

WHAT HE MAY EXPECT from the company and what is expected of him is explained to each new employee with aid of a company booklet.

If the answer is "Yes," the applicant may then be asked to undergo pre-employment testing. Tests are available for employing city, branch house, and plant salesmen, ice cream salesmen, stenographers, typists, file clerks, comptometer operators, messengers, clerks, standards checkers, plant food representatives, egg candlers, and field men for dairy and poultry plants.

H. E. Frey, employment manager in the company's general office, explains that the tests are used as a guide in evaluating the interests, skills, and personality characteristics of applicants. One 20-minute written test measures mental alertness. Another checks on vocabulary (important in sales). Mathematical skill is tested.

Each test has been "validated" or proved to apply to the work of a particular group whose performance already is known. Tests for salesmen are validated against the average for all salesmen, hatcherymen against all hatcherymen, and so on. Scores show how an applicant will rate with a fixed group, rather than with a cross-section of all employees. Batteries of tests are set up for specific aptitudes. None applies to company-wide interests.

Additional tests covering other types of work are being developed. However, tests serve only as a supplement to the usual interviewing technics, never as a deciding factor in selection. A physical examination also is required.

If the job-seeker is considered qualified, he is then referred for a further interview to the supervisor or head of the department for which he may finally be hired. This interview covers much the same subject matter as the preceding interviews. These men want

MEDICAL CARE is considered highly important in maintaining good employee relations. Fine facilities are available in all major Swift units.

to know: "Will he fit into this department?" They have the authority to accept or reject him for employment.

On the Job

Employees hired for the general offices in Chicago are requested to discuss their jobs with one of the employment staff one month after they begin work. A similar interview is scheduled for six months after the job begins. Another takes place at the end of the first year, followed by others at yearly intervals for the first five years. Each interview is based on an appraisal report by the department head. The company wants to be sure the employee is working at the job for which he is best qualified.

"One of our chief requirements is interest in the job," North explained. "We look for any usable skill a man can bring to a job to avoid placing him in a position beneath his ability. We want him to derive from his job not only financial income but also the satisfaction that comes from work he likes. This is necessary to success."

When he is hired, the employee has a right to expect proper introduction to both the company and the job. Swift & Co. assumes this responsibility. Not only is the new employee given personal supervision at the start, but also a good foundation in how the company as a whole operates; and what he can expect in benefits, promotions, and pay.

At the time he is hired, each new employee is given an attractive handbook: *Your Job With Swift & Company.* Containing a wealth of information, this handbook becomes a ready reference on company policies and history. There are also supplementary informal talks.

Union Relations

Labor-management relations are recognized as a model within the meat-packing industry. Groups of employees at some units have chosen to be represented by unions. Units such as dairy and poultry plants, plant food factories, oil mills, and the like, negotiate their agreements plant by plant. On the other hand, meat-packing plants generally have Master Agreements with one of three labor unions. Each Master Agreement covers the Swift plants that are represented by a particular union. The three unions are: United Packinghouse Workers of America, affiliated with the CIO; Amalgamated Meat Cutters & Butcher Workmen of North America, affiliated with the AFL; and, National Brotherhood of Packinghouse Workers, affiliated with the CUA.

In its widely scattered operating units, the company bargains with approximately 25 different independent, national and international unions, representing company employees in nearly 300 different bargaining units. There are approximately 250 different agreements to be reached with these unions.

After the new employee has been properly indoctrinated, his future with the company rests largely within himself. For the most part his rise is governed by his willingness to undergo training.

One of the company's annual reports to the shareholders pointed out that the company's physical assets, important as they are to the success of the business, would be worthless without people—"people with ability, knowledge, skill, imagination and leadership. The success of any business hinges on how well it is able to organize, equip and train its people—all the way from the bottom to the top."

Training Programs

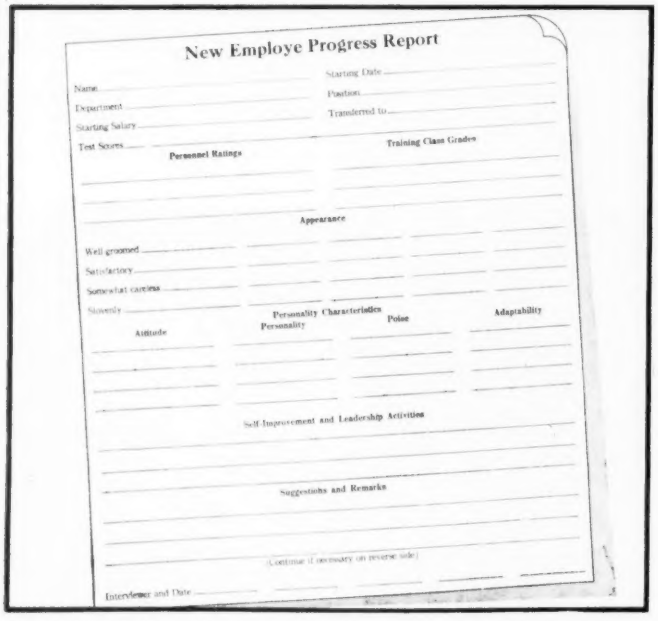
Swift & Co. has several such training programs that reach "all the way from the bottom to the top." They include employee development, courses for training salesmen, programs for supervisors, and an executive development program. Others are devised as the need arises. The courses are open to all employees whose qualifications merit admittance, regardless of the amount of formal education they may have had. A man who lacks a college education does not suffer any particular disadvantage, because the company recognizes that he might have had some good reason for choosing to go to work rather than to go to college. And the company has facilities to give him training in the fields of his ability.

Schools for sales training are permanently housed in their own quarters at strategic locations throughout the country. Other schools are conducted during working hours in company conference rooms, and still others are carried on through correspondence as a convenience to students.

Exemplifying employee development is the program for young men under 21 in the General Office. It has been in operation for over 30 years. This is a program in which the employee enrolls when he is hired. It is called "Swift & Company's Business" and offers two years of study. It gives every messenger boy, file clerk, and junior clerk thorough training in the company's business methods.

Report Double Checked

Reports are sent to the employment department and the head of the department where the student is employed. These reports are in addition to those regularly turned over to the employment office by the department manager. By this double check, management learns whether the student is capable of further training, and also what work he can do best. As a result, there is little chance for a young Gen-



New Employe Progress Report

Name
Department
Starting Salary
Test Scores
Starting Date
Position
Transferred to
Personnel Ratings
Training Class Grades
Appearance
Well groomed
Satisfactory
Somewhat careless
Slovenly
Attitude
Personality Characteristics
Personality
Poise
Adaptability
Self-Improvement and Leadership Activities
Suggestions and Remarks
(Continue if necessary on reverse side)
Interviewer and Date

AT REGULAR intervals, new employee's progress is checked by company interviewer and recorded on this form.

eral Office employee to get lost in a blind alley or "tough it out" in a job for which he is not well suited. If he shows up poorly on the job report, chances are his training report will show where he would be better suited, and he is transferred. Also, the double set of reports are a key to advancement, and when vacancies occur, the well-qualified employee is ready for the next step up in the organization.

All stenographic help for the General Office goes through a training course for an over-all view of company operations so that girls have an equal advantage in scientific job classification and placement.

Meat packing plants also have a two-year course similar to the first two years of the office program, extending through 40 meetings a year. A good rating at the end of two years is a helpful step toward advancement.

Training Supervisors

Newly appointed supervisors at packing plants are enrolled in the New Supervisors Training Program. Here is the curriculum:

Part I—Individual study and training. Consists of discussions of the pertinent job topics with selected leaders. Conducted during the first two weeks after the man's promotion.

Part II—One or two weeks on-the-job training. Consists of observing and studying the way experienced supervisors carry out their responsibilities.

Part III—Review and individual study for one week on related subjects not covered in Part I.

Part IV—Basic supervisor training program, to be completed within one year. Subjects include: Job Instruction, Job Methods, Job Relations, Employee Relations, How We Live, Swift & Company's Management, Safety Through Supervision.

Free correspondence courses covering a wide field are available to all employees. There are now 21 of these courses, and they extend from three to twelve lessons each. Special phases of the company's business are covered, such as processing of cured and smoked meats, fresh meats, livestock production and marketing, manufacture of technical products, operation of dairy and poultry plants. There also are courses in industrial relations, advertising, and company history.

An employee who takes the correspondence courses may receive help from the management of his local plant. These management people, who are among the most important key men in the organization, add a practical viewpoint to routine study, but mostly they keep the student's interest alive. There is less of a feeling of being in a "correspondence rut" when the student knows that a management representative is personally interested in his studies.

Training Salesmen

The Sales Training department has a specialized program. Its function is to develop and administer: (1) The selection of men who intend to follow sales as a career; (2) a basic course to train salesmen in product and policies; (3) a program of continuous training mainly in the form of sales meetings in the field; (4) a program on sales supervision; (5) an up-to-date method of evaluation or merit rating geared to the development of sales personnel to help correct weaknesses and develop strong points.

These programs operate under the leadership of trained sales people. Special training centers, equipped with modern teaching aids, have been established in 13 key cities in the United States and Canada.

New meat salesmen entering the business are given several weeks of experience, either in a packing plant or a branch house, before being sent to the organized training center. Each salesman is required to take the complete course before he is given a permanent territory assignment. Refresher courses are also conducted to keep men informed on the latest selling technics. Up to this time, 6,700 such salesmen have been given one or another of these Sales Training Courses.

■ "Good employee relations is a two-way street. In the final analysis, people are known by the company they keep, and a company is known by the people it keeps."

One speciality course is morale training for management. Its aim is to teach human relations. The attention-getter and permanent reminder of the course is a wooden Indian. He can stand outside in the wind and weather, suffering all the indignities of man and beast, without flinching. That's because he has no heart and no feelings, because he's made of wood. But an employee—well, you get the distinction. The final result of this added education and training is a group of people who can produce greater volume—efficiently and effectively.

The company has proof that these various training programs are a good investment. A survey once revealed that 80 percent of the Swift executives began at the bottom of the ladder as messengers or clerks and worked their way up as a result of some form of company training. Only 15 percent began in slightly higher management jobs, such as foremen or assistant department heads. Five percent started in executive positions as a result of their training in professional or technical fields. The example of beginning at the bottom is, of course, John Holmes, who began as a messenger boy and is now president of the company.

Employee Benefits

What more can a Swift employee expect? Well, there is much more in the way of benefits. Some of these, recently made popular by general demands for social security, have been company policy for over a quarter century. Changes and additions to employee benefits are made frequently to keep pace with changing conditions.

In 1900, the company first employed a doctor full time to minister to the health needs of employees at work. Today there are 32 doctors and 67 nurses in medical departments at meat-packing plants, besides various additional arrangements with the medical profession at other locations.

In 1907, the Employee Benefit Association was established to provide financial assistance in times of accident, illness, and death of members. The members contribute to this activity, and it is self-supporting.

Organized safety programs reduce the accident hazards of faulty equipment and faulty human behavior. Today the Safety Section of the Industrial Relations department devotes its full attention to the reduction of accidents.

The policy of guaranteed weekly hours of work for hourly-paid employees in meat-packing plants was established in 1911. Even today—39 years later—the practice of guaranteed pay is rare in industry. Swift guarantees 36 hours of pay for each work week.

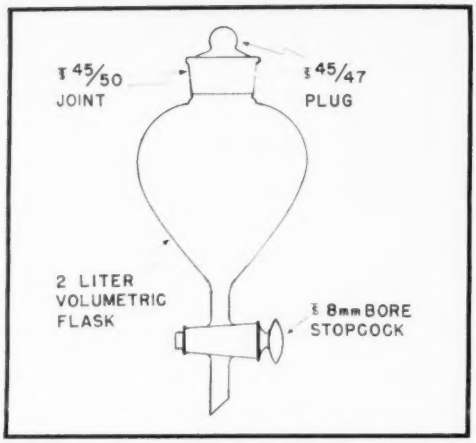
In 1913, a program for sickness and disability payments to workers was inaugurated whereby employees unable to work because of illness or non-compensable accident receive payments for a period based on their length of service.

A non-contributory pension plan applicable to all employees was established in 1916. Today there are 3,800 employees and 2,500 widows and orphans on the retirement rolls, making a total of 6,300 persons who are receiving payment from the pension fund.

Other benefits include: (1) One to three weeks of vacation with pay for hourly-paid and salaried workers—a plan which has been liberalized several times since its inception; (2) a sound wage incentive plan through which employees at the meat-packing plants

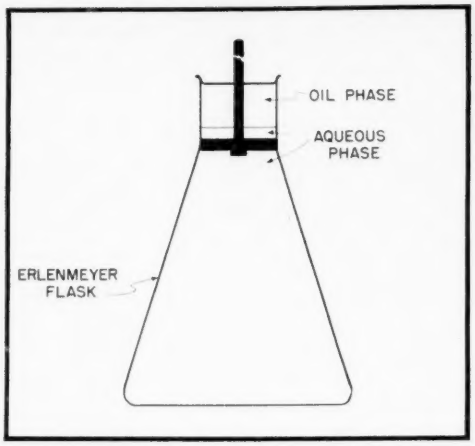
(*Turn to page* 171)

ADOPTED—15-Min. Tester



SEPARATORY FUNNEL was specially designed for new test. Performance: Top recovery in matter of minutes.

DISCARDED—Hour-Plus Flask



ERLENMEYER FLASK was used for Wildman test. But method was tedious and time-consuming—took 60 to 90 min.

Get Quicker Insect Counts on Raw Foods

New gage of contamination level slashes test time and labor 75 percent. And product is saved because the "answer's in" at very start of processsing

PHILLIP E. GILBERT and WILLIAM F. FILZ

Food Technology Department, Oregon Agricultural Experiment Station, Corvallis, Ore.

Detection of worm and insect contamination of raw foods prior to processing is now speeded by a new method that lends itself to better food plant applications. Particularly noteworthy among these applications are evaluation of plant efficiency, improvement of unit operations, and new facilities in establishment of standards.

This new method was recently developed in the Food Department of the Oregon Agricultural Experiment Station.

Five specific advantages over the older Wildman technic have been recognized. Here is a brief of these benefits:

- Considerable time is saved. The Wildman test takes 60 to 90 min. to perform, while the separatory method requires only 15 min. This translates into direct savings of 75 to 80 percent in labor cost.
- The new method is simpler, and accordingly the training period is much shorter. It is not necessary to employ a highly paid skilled technician.
- A more efficient recovery of contaminants can be obtained, since oil losses are now reduced to a minimum.
- Readability of the glass slides is improved because pulp is eliminated from the oil phase. As a result, a more accurate count can be made of the contaminants.
- The combination of the above advantages permits the use of this method as a quality-control tool rather than merely a means of complying with regulations.

By the old Wildman method, counting insects on prepared glass slides under the microscope was a tedious and time-consuming job. Harrison[1] reports that it is difficult to complete the test in less than 1½ hr. Other investigators[2,3,4] have also found this technic is unsatisfactory.

Because of these difficulties, primary use of the Wildman method for detecting worm and insect contamination in raw foods is now restricted to determining the condition of products with regard to Food & Drug regulations.

Take the case of broccoli. Since it takes 1 to 1½ hr. to complete a Wildman-extraction test, more than 1½ tons of the vegetable (production rate: 3,000 lb. per hr.) would be processed before determination of the contamination level. Should the level be too high, a considerable loss would occur. Thus, reducing the time required to perform an extraction test would be of considerable value. And both labor and product can be saved if the contamination level can be gaged before the processing of each lot of food has progressed too far.

The Wildman method requires the use of careful technic because of possible loss of contaminants in the transfer of the oil. According to Wilder and Joslyn,[4] even with the most exacting technic it is not always possible to read a slide and thus determine the amount of insect contamination. The apparatus is constructed so that it is conducive to the formation of oil-in-water emulsions that further complicate the separation of the contaminants from the pulp. Modifications of the extraction apparatus and media by Wilder, Joslyn, and Tilden[3] have all proven to be lacking in some respect. For these reasons, it is evident that the Wildman-trap flask assembly leaves much to be desired in the way of an efficient apparatus for this type of separation.

Old Test Papers Vs. New: There's no pulp-clutter the Separatory way

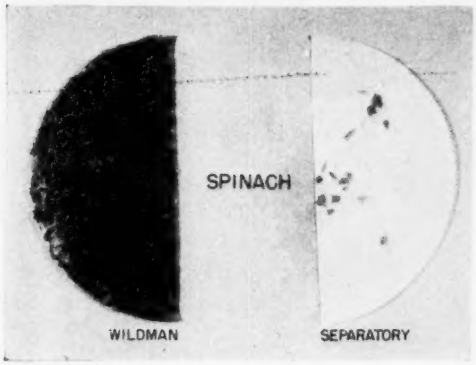


FIG. 1. Note excess pulp trapped off old Wildman way.

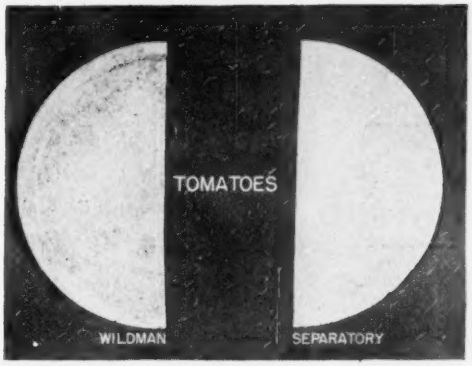


FIG. 2. Pigment colors paper, regardless of method.

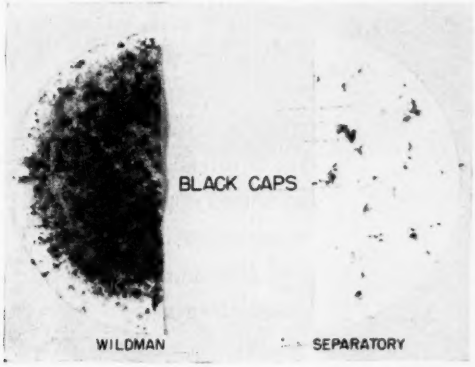


FIG. 3. Trapped off pulp (left) confuses technician.

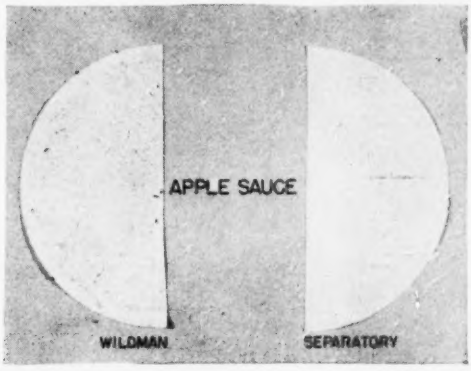


FIG. 4. Apple sauce cells make fragment count difficult.

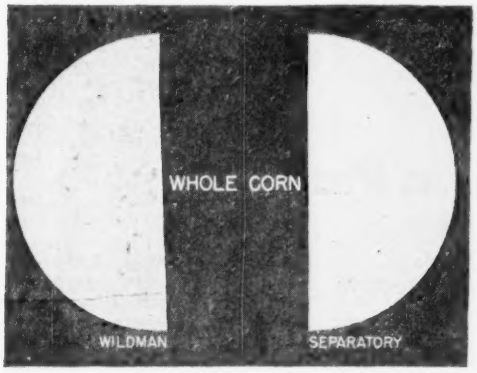


FIG. 5. Seed coats hinder extraction by Wildman technic.

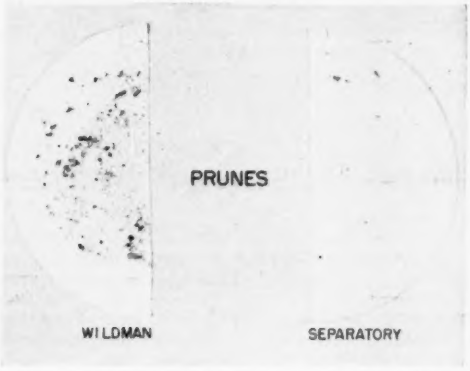


FIG. 6. Prune bits resemble skins of certain larvae.

Since the Erlenmeyer flask used in the extraction test is cone-shaped with the apex upward, it is necessary for the oil globules containing the contaminants to travel horizontally as well as perpendicularly. This factor greatly influences the time required for the oil to rise to the surface, and it also results in the adherence of oil to the side of the flask.[5] Moreover, in trapping off the oil layer, it is very difficult to completely rid it of the pulp. Howard[6] found that in order to recover all of the oil, it is necessary to trap off a little of the aqueous phase. And pulp is trapped off with the oil.

We believed that an apparatus could be devised that would eliminate these difficulties and reduce human error to a minimum. It seemed that if the flask could be inverted and the aqueous phase could be drawn off from the bottom, the apparatus would be more

(*Turn to page* 172)

New Plant, New Product, New Package . . .

ULTRA-MODERN white-concrete plant, with aluminum trim and ceiling, houses advanced processing and packaging operations of Plantation Foods, Inc., Uleta, Fla.

DICED CREAM in individual cartons with insulated wrap is unpackaged and studied by author (left) and sales-executive associate, Robert Bruce. Complete package and waxed-paper overwrap are at left.

Things are done differently at new ice cream plant in Florida. Novel concepts are involved, as well as advanced engineering and innovations in packaging and distribution. It's a stimulating story

R. E. KIBBE
Vice-President in Charge of Production.
Plantation Foods, Inc.,
Uleta, Fla.

New Business Pioneers in Progress

Capitalizing on a series of new and unusual developments, Plantation Foods, Inc., has built an advanced processing operation in an ultra-modern building at Uleta, Fla. And the company has developed new packaging and distribution ideas, is making the latest thing in ice cream, and now is in the process of building a new business.

An attractive and functional single-story white concrete building, with aluminum trim, was erected recently as a plant for freezing pineapple. But that project was abandoned and the plant equipped to make Diced Cream.

Advanced processing methods and equipment were installed to prepare, freeze, package and harden the product. These include continuous mix pasteurization, a new continuous quick-freeze unit, and a highly efficient three-stage refrigeration system. Among the interesting packaging and distribution innovations are an insulated package, special "bulk" containers for truck and rail shipment, and self-service selling in supermarkets.

Insulated Package for Self-Service

Behind the idea of using an insulating wrapper is a new concept of ice cream distribution. Velda Diced Cream and Velda pints are being sold in self-service stores, from open-top low-temperature display cabinets. It is anticipated that this method of distribution will give high-volume sales and also help to keep the distribution cost down. But one of the requirements of a package for ice cream which is to be purchased when the housewife does her food shopping is that it keep the ice cream frozen until the purchaser gets it home. This, the Velda wrap does, being B-flute corrugated cardboard with good insulating value.

Previously, insulated wrapping for

ALUMINUM BINS holding 200 gal. are used for shipping ice cream in refrigerator cars. These are loaded onto cars by lift-truck.

PORTABLE, 50-gal., insulated, aluminum container in which packages are trucked to stores. Refrigerated trucks are not needed.

ice cream has been considered prohibitively expensive. But the B-flute cardboard is low in cost, and when applied by automatic machine it will entail little production-line expense. Packaging will cost only $1S per 1,000 pints.

Another requirement for self-service ice cream distribution is, of course, open-top cabinets which will keep the temperature of the product below zero until purchased. The recently developed cabinets used for Velda hold a temperature of 15 deg. below zero, yet the layer of air above the packages is not so cold as to be uncomfortable to the hand which reaches for a package.

The cabinets have refrigerated plates on two sides, plus a self-defrosting coil lengthwise of the box. Fans blow air over the coil and across the top of the packages, the air passing downward at the front of the case and back under the packages to the circulating fan.

OPEN-TOP self-service refrigerated display case used in stores selling Velda ice cream. Cabinet will maintain below-zero temperature.

Two Shipping Innovations

Almost as unique as the insulated package are the methods and equipment used in shipping the ice cream from the plant to stores. Trucks are used for local deliveries, but they are not insulated. Instead, the packages are in 50-gal. portable aluminum bins mounted on casters and insulated with 5-in. of foam plastic to keep the ice cream frozen for 12 hours. The packaged and hardened ice cream is put into these bins and moved into the low-temperature storage room. Orders for supermarkets are made up in the bins for efficient delivery service.

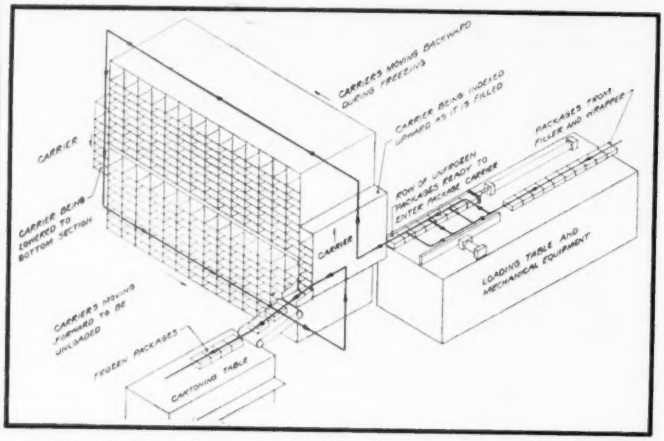
Outgoing bins are loaded onto delivery trucks equipped with power-operated tailgates that easily lower the bins to the sidewalk at the retail store.

Yet another innovation in distribution will be the use of railway refrigerator cars for shipment of Velda ice cream to other cities—Jacksonville, Tampa and Orlando. The railroad is building cars with heavy insulation and with Kold-Hold refrigerating plates which can be hooked up to the plant refrigerating system. These cars will be operated on passenger-train schedules. Those picked up at 8 p.m. will arrive in Jacksonville at 8 o'clock the next morning.

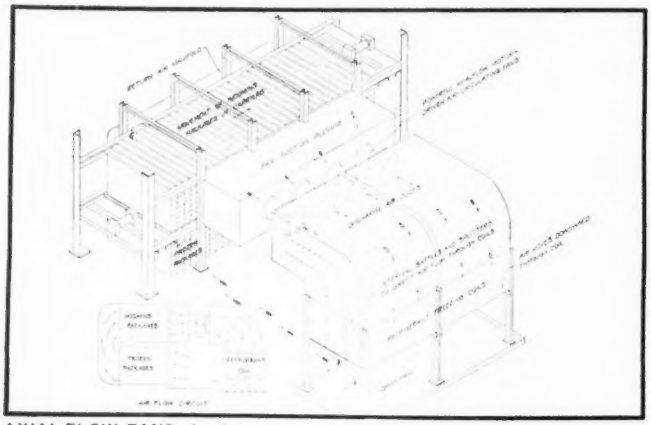
The Diced Cream and pints to be shipped by rail are put into 200-gal. open-front, non-insulated aluminum bins, these being loaded in the storage

Novel Quick-Freezer Hardens Ice Cream

FEED END of continuous quick-freezer, designed for packaged foods. Unit hardens ice cream after it has been filled into containers.


CARRIERS MOVING BACKWARD DURING FREEZING
CARRIER BEING INDEXED UPWARD AS IT IS FILLED
CARRIER
PACKAGES FROM FILLER AND WRAPPER
TOP OF UNFROZEN PACKAGES READY TO ENTER PACKAGE CARRIER
CARRIER BEING LOWERED TO BOTTOM SECTION
CARRIER
LOADING TABLE AND MECHANICAL EQUIPMENT
CARRIERS MOVING FORWARD TO BE UNLOADED
FROZEN PACKAGES
CARTONING TABLE

PISTON PUSHES packages onto freezer shelf, frozen ones being forced off. Then carrier moves up to bring another shelf into position. Full carrier is pushed toward rear and another comes up. Each carrier makes circuit from front to rear, down, back, and up.



AXIAL-FLOW FANS circulate air over coils, then across coldest packages on bottom row of carriers and back over warmer packages on top.

room and placed in the refrigerator car with a lift truck. There will be 48 of these bins per car, or 9,600 gal. of ice cream. Yet a car can be loaded in 1 hr. with one lift truck.

New Continuous Hardening Unit

The new continuous hardening machine, an air-blast packaged-food freezer called the Freez-Pak, has rows of aluminum package carriers, or racks, which slide on rails. Each rack has a series of shelves as wide as a package and long enough to hold 25 pints. Automatic indexing mechanisms raise a rack so that a shelf is level with a feed-in conveyor. Then an hydraulic piston pushes in a shelf-load of packages, and the rack is elevated so that a second shelf is available. When the rack has reached the top position, an hydraulic arm pushes it rearward along the rails, and another rack comes into loading position.

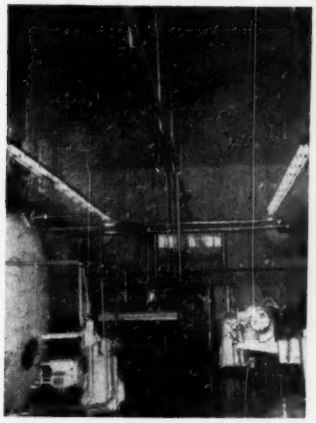
There are top and bottom rows of racks, the newly filled ones moving to the rear in the top half of the unit and then coming back along the bottom half. And when a group of packages is pushed onto a shelf, these force the packages of hardened ice cream off that shelf and onto a conveyor.

Built to handle 1,000 gal. an hour, the freezing unit was designed by Freezing Equipment Sales, Inc., York, Pa., in collaboration with V. C. Patterson & Associates, Inc. (Mr. Patterson is president of Plantation Foods). The first installation is now freezing packaged foods at the plant of John H. Dulany & Son, Inc., Exmore, Va.

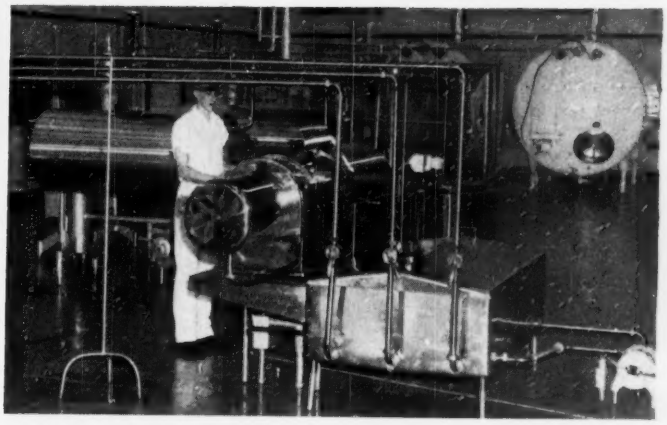
Well-Engineered Process

Velda ice cream is processed in a 120x80-ft. one-floor area with sheet-aluminum ceiling and tile walls and floors. The operation starts with the preparation of 67 percent simple syrup, since liquid sugar is not available. The syrup is pumped into two 2,500-gal. glass-lined storage vats, and from there goes to mix tanks through stainless steel lines and a preset flowmeter to measure the quantity.

Another ingredient is 80-percent plastic frozen cream. This is stored in 5-gal. paper cans at below-zero temperature. It is prepared for use by shaving. The operator places a can in an electrically driven stainless steel comminuting machine. An air-operated arm forces the can over a knife to cut the paper. Then the can is peeled off, and the cylinder of frozen cream is placed ahead of an hydraulic ram which feeds it at 72 in. per minute into a heavy 4-blade rotating knife driven by a 10-hp. motor. The shavings fall into a chamber and from there feed into a 300-gal. stainless steel tank alongside the machine. Simple syrup and dairy products are metered into



SHEET-ALUMINUM ceiling helps to keep plant cool, requires no paint.



FROZEN PLASTIC cream is shaved in machine in foreground, and mix is made up in tank alongside the comminutor. (Floor has been changed to tile.)

this tank, which is equipped with a sanitary circulating pump.

After the mix is prepared it is pumped to the first continuous preheater at a rate of 15,000 lb. per hr. Passing through a series of stainless steel tubes which are surrounded by live steam under vacuum to lower the steam temperature, the mix is heated to 135 deg. F.

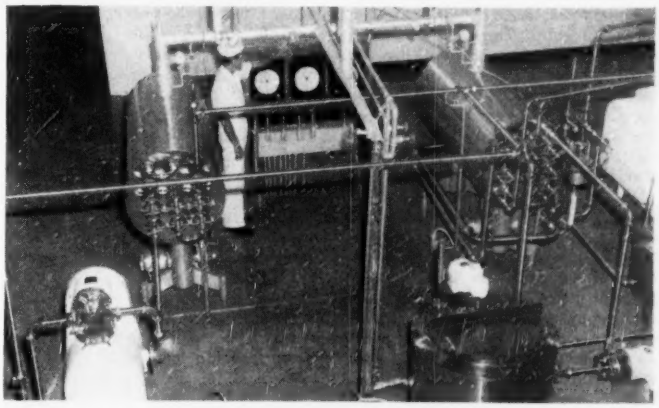
The rate of flow to the balance tank and second preheater is controlled by the homogenizer, which handles 9,000 lb. (1,000 gal.) per hour. Some of the 6,000-lb. per hour excess of 135 deg. mix goes back to the mixing tank to put the frozen cream into solution. And some of it is bled off to the stabilizing tank, from which it goes to the second preheater.

The second preheater raises the mix to 155 deg. F., and the mix goes to the homogenizer and then to a final heater stage. This heater brings the temperature to 175-178 deg. F., and the mix is kept at that temperature for 25 seconds in a 3-in. holding tube. An air-operated diversion valve, actuated by an automatic temperature recorder-controller, insures proper pasteurization.

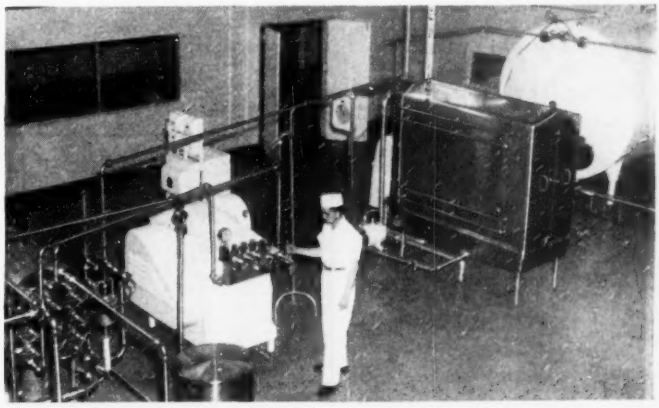
The pasteurized mix is reduced to 100 deg. in the first stage of a cabinet cooler, 75-deg. well water being the cooling medium. Then it is pumped to the direct-expansion ammonia-refrigerated second stage of the cooler, which reduces its temperature to 34 deg.

Now the mix is pumped to storage tanks, where flavoring is added. Motor-driven propellers agitate the mix to insure thorough flavor blending, and the mix is frozen on the following day.

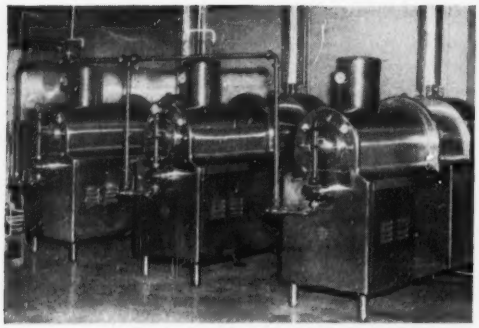
This procedure of incorporating flavors necessitates minimum runs of 1,000 gal. for a mix of a particular



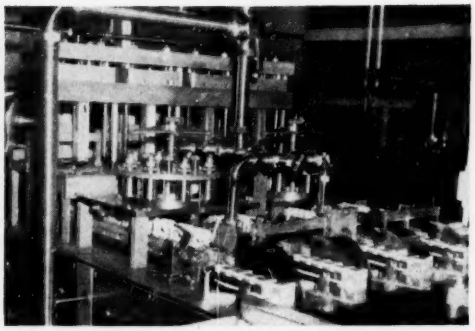
CONTINUOUS heat-exchangers preheat and pasteurize mix. Product flows through tubes surrounded by steam under vacuum to lower temperature.



PASTEURIZED MIX is homogenized and cooled in two-stage cabinet cooler. Flavoring is added in holding tank at right.



BATTERY of three continuous freezers, each with 400-gal.-per-hour capacity, reduce mix to semi-frozen product and introduce overrun.



FROZEN MIX is packaged in individual-service containers by battery of four machines which form, fill and close the packages.

flavor. But a product of higher consistency can be handled in the freezers, and overrun can be more closely controlled.

The freezing equipment consists of a battery of three 400-gal.-per-hour continuous units. These discharge into machines which form, fill and close the small individual Diced Cream cartons (see FI, Mar. 1949, page 74). No less than 10,000 of these cubes of cream can be produced and packaged per hour. Ice cream also is packaged in pint containers.

As the filled dice cartons come off the machine, girls put 20 of them into lightweight fold-up chipboard containers that are closed with Scotch tape. These containers have four ¾-in vent holes across sides, top and bottom and one such hole in each end.

In the chipboard containers, the Diced Cream packages are conveyed to the continuous hardening machine. When enough of the containers to fill a shelf on the hardening unit (25 pints) are lined up, one behind the other, in front of the machine, a trip switch operates a pneumatic pusher bar which shoves the containers sidewise onto a parallel conveyor. From this conveyor, the ice cream is pushed endwise onto a shelf of the continuous freezer by an automatic hydraulic piston.

After the ice cream leaves the hardening machine, the packages are conveyed to the packaging department. Here the cubes of cream are removed from the chipboard containers and wrapped in groups to form 1⅛-pint (plus) and half-gallon retail packages.

Insulating B-flute corrugated paperboard is the first wrap. This material is cut from a roll to a T-shape that provides overlapping ends and sides, the side overlap being glued. Then this insulated unit is overwrapped with rotogravure-printed waxed paper and heat sealed.

Automatic wrapping machines are being installed to apply both the insulating cardboard and the overwrap automatically, at high speed.

Efficient Refrigeration

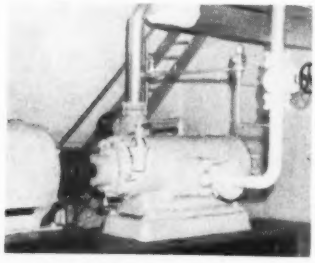
To efficiently handle its varied and complex refrigeration requirements, the company has installed a three-stage ammonia compression system, with interstage liquid cooling and with carefully planned interconnections (see diagram). Here is a description of the cycle by J. R. Yost, operating engineer:

"Suction gas from the hardening machine coils is taken via the first-stage accumulator to the intake of the first-stage rotary compressor at 16-in. vacuum (corresponding to 60 deg. F.). Rotary discharge, along with suction gas from storage room coils, and from the ice cream freezers, is taken via the second-stage accumulator to the intake of the second-stage compressor, at 0 lb. gage (corresponding to 28 deg. F).

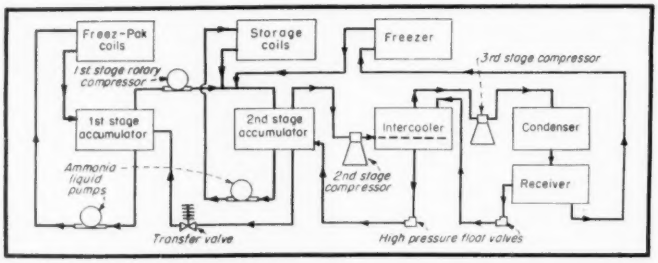
"This compressor discharges at 10 lb. gage through a liquid ammonia bath in the intercooler, thence to the third-stage compressor intake. Third-stage discharge varies seasonally from 90 to 180 lb. gage. It passes through enclosed shell-and-tube condensers which use spray-pond water as the coolant. The difference between actual condensing temperature (as shown by thermometer in the condensate line) and the temperature corresponding to actual condensing pressure (as shown by compound gage on discharge) is held to a maximum of 3 deg. Removal of non-condensibles to maintain this small difference is accomplished by means of

(Turn to page 176)

Efficient Three-Stage Refrigeration

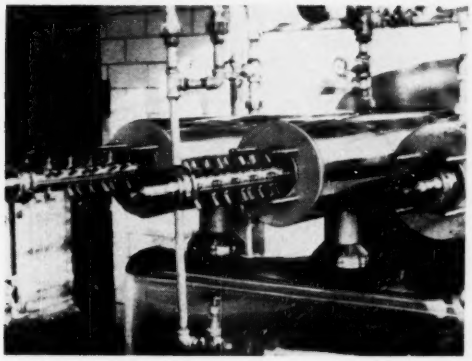


ROTARY BOOSTER compressor unit. Moisture-proof pipe insulation is foam plastic, with aluminum covering.



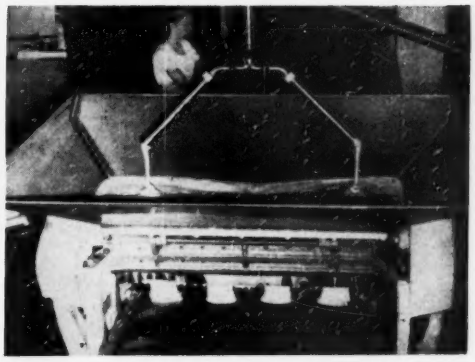
SCHEMATIC DIAGRAM of efficient three-stage ammonia refrigeration system. It has interstage liquid cooling and carefully planned interconnections. Plant refrigeration requirements are varied and complex.

From continuous mixer . . .



HUNDREDS OF SMALL PINS, on rotor, whip batter to fine emulsion. Three-tube unit is rated at 1,500 lb. an hr.

. . . to depositing hopper



BATTER is extruded to scaler, then deposited in baking pans beneath. Hopper level is always at 6 to 8 in.

Continuous Mixing Yields More and Better Cakes

Detroit baker also gets greater product uniformity, improved sanitation—all without skilled labor

CARL DENTON
Production Manager
Farm Crest Bakeries, Inc., Detroit

We at Farm Crest Bakeries are producing cakes of higher quality, better appearance and with increased shelf life, while achieving greater productivity and uniformity, improved sanitation and more efficient utilization of raw materials. We credit this to continuous mixing of cake batters.

It has been improvement in grain and texture, and increase in volume that have stepped up the quality, appearance, and shelf-life. Greater uniformity of product is obtained because the time interval between ingredient mixing and baking is constant with every cake in the day's run.

The batter produced by continuous mixing is such that even a skilled mixer cannot duplicate it with conventional equipment. And this batter can be produced without skilled labor and needs far less work.

We believe that continuous mixing gives these seven fundamental advantages over conventional batch methods:

1. *Positive, day-to-day control of batter mixing.* Throughout the year, regardless of weather or shop temperature and conditions, batter density and temperature are always at fingertip control. The amount of mixing, as measured by work, is variable within the proper limits, since the unit is fitted to the oven capacity.

2. *Perfection in mixing procedure.* Perhaps "perfection" is an extravagant word, but we have achieved absolute elimination of lumps and unmixed raw materials and uniform blending of all ingredients in every pound of batter. And without the skill required by conventional methods.

3. *Better shop sanitation.* There is less spillage, no batter mixed ahead, and less work in the mixing room. Batter is mechanically transferred direct to the depositing machines by sanitary pipe. Since there are only 6 to 8 in. of batter in the hopper at all times, this usually messy unit is now a model of cleanliness.

4. *Greater shop capacity.* Size of the baking oven is usually the limiting factor for shop capacity. Continuous mixing produces batters at temperatures ranging from 90 to 100 deg. F. (depending on the variety), or about 20 to 25 deg. above normal. This is theoretically the same as adding length on the feed end of a tunnel-type oven, since the first 10 or 12 ft. of a 100-ft. oven are spent in raising the batter temperature from a normal 70 deg. F. to the 90-100 deg. F. at which batter is produced by our mixer.

For example, on a layer cake that takes 15 min. to bake, about 2 min. is required to bring the entire mass from 70 to 95 deg. F. Setting up a proportion, we have, in effect, added from 12 to 15 ft. to the feed end of a 100-ft. tunnel oven. Savings in fuel have not been computed. The heat for the continuous-mixed batter is not applied, but brought about by the work factor within the unit.

5. *Mixer-to-oven time lag eliminated.* Batter usually goes into the baking chamber seconds (at most a few minutes) after mixing, and always with the same time lag between the two units. The batter is mixed and discharged from the pipe into the depositing-machine hopper, where only enough batter is maintained to keep this unit functioning properly—from 6 to 8 in.

6. *Batters of consistent density produced.* Because the batters are of such uniform density, once the depositor is set on the proper weight for a particular variety, no further correction is needed. Even several hours of running entails no need to change the weight control wheel.

In conventional mixing, changes in batter density occur both from variations between the batches and by chemical action of the leavening agents while the batter stands. These changes, though minute, do require small adjustments on the scaling machine. Also, as the scaler progresses from a full hopper to an empty one, the decreasing weight of the batter in the hopper influences the amount of batter being drawn into the chamber of the depositor or being cut off by the knife. All this is eliminated by constant flow of positively controlled batter with only a few inches in the hopper at all times.

7. Final cakes are higher quality, look better. While cakes baked from batters mixed continuously are bigger, the value of this increased volume in the form of batter saving or larger unit size is really secondary to the increased shelf-life, higher quality, and improved appearance inside and out. These advantages are credited to closer integration and better utilization of the raw materials. Resulting are a batter and a product that look somewhat richer than they really are, because this type of texture and keeping quality is usually associated with high egg- and shortening-content cakes.

It is *doubly emphasized,* however, that attempts to cut these enriching ingredients result in gumminess, poor taste, and a definite lowering of eating quality, even though the physical aspect of richness may still be there. Continuous mixing is a process to enhance and bring out the full advantages found in these enriching ingredients, and definitely is not a substitute for them.

Process Described

We use a Votator Mixer made by The Girdler Corp. It is a 3-tube unit with whipper shafts rotating at high speed. Batter is produced at a normal rate of 1,500 lb. per hr.

The batter is mixed as follows: All raw material is scaled off into a bowl and slurried together. The mixture is then gravity fed into a holding tank on the floor below. Here, it is strained and kept under slow agitation. A pump introduces it into the mixer. Air feeds in, and the mixture is forced through the tubes.

Hundreds of small pins on rotors traveling at 800 rpm. do the whipping. Under pressure, this literally "molecules" the raw material, incorporates the air, and finally produces a very fine emulsion. Enclosed sanitary pipe transfers the emulsion to the sealer, where it is extruded through a spiral-type valve that controls the back pressure.

■ **For continuous mixing of batters to be successful on a production basis, optimum working levels must be obtained for three basic factors—DENSITY, TEMPERATURE, and BACK PRESSURE.**

1. Batter density is the most important factor for good continuous mixing. As all bakers know, a properly mixed batter with the correct amount of air incorporated yields better cake than a sloppy heavy mixture from the same formula. It appears that a given formula takes only a definite amount of air for optimum cake. When more than the required amount is incorporated, there is extreme surface agitation as the air escapes upon discharge of batter from the unit. Some of this is inevitable when mixing is done under pressure, but at the correct density it is hardly noticeable.

In our determination of the correct density, we found that as density decreased, quality of the cake improved up to a point. In other words, for continuous mixing it is not true that the lighter the batter the better the cake. This is so because when mixing under pressure in an enclosed space, more air can be put in than the batter medium will hold. Air thus becomes a potent ingredient. Too much air results in rupture of the cell structure and coarse texture.

Batters that do not have enough air or that are too heavy lack symmetry and volume or require more baking powder. Baking powder can be rebalanced to a degree, so that the incorporated air may replace some of the chemical leavening action that results in longer shelf-life. It is stressed, though, that this is a very fine adjustment, for baking powder is also a support during the baking process.

2. Correct temperature of the batter, the second factor, was determined in the normal manner of baking samples taken at different temperatures at a common density. When the highest temperature at which a batter would produce a good cake was reached, the density was varied to ascertain whether a change was necessary at the new temperature. It was generally found that the density, once established, was fairly constant. Slight changes were made after volume production was under way.

3. Back pressure, factor number three, was easy to arrive at because, once the density factor was known, it was necessary only to bleed into the unit the amount of air required to get this density and then use just enough back pressure to incorporate all of it. Using more back pressure than necessary increases the load, heats the batter, and is extra work done. If carried too far, it will result in batter breakdown or possible inversion of the emulsion. When back pressure is lowered beyond the point where air is properly incorporated, "blow-by" (air bubbles) comes out of the feed pipe, and density of the batter increases accordingly.

Details on Mixer Operation

Our continuous mixer was designed for production needs. It was found that installation of an ammeter provided a most accurate control on batter quality by evaluating the work factor. The motor load being proportional to work done, the ammeter tells constantly and accurately whether the batter is worked sufficiently, is too dense, etc.

At present, our continuous mixer is operating on a full day, and during a week it is used for eight different batters. Changes from one batter to another are effected by running out of one premixture, cutting off the air, introducing the next variety into the holding tank, and running without air for a moment or so. The first 25 or 50 lb. out of the pipe may be recycled through feed tank. Changes from white to yellow, and yellow to chocolate, are made without loss of time or material.

Scraper blades on one or more of the rotors, as the occasion demands, provide a clean tube surface for rapid heat transfer, either for cooling or heating. The unit is flushed out at the end of the day's run until all traces of batter have disappeared. Pipes, tank, and pump are disconnected and sent to the washroom. Twice a week the rotors are removed and inspected for possible accumulation of extraneous material, such as string or pieces of paper, so as to remove the chance of food material being lodged anywhere.

The proper straining of premix and adequate daily flushing immediately after the day's run seem to be taking care of the former contingencies. Dismantling unit, pulling rotors, cleaning

(*Turn to page* 178)

THE VITAL STATISTICS: They Give Inside Picture of Mixer Operation

TABLE—CONTINUOUS MIXING FIGURES on different type batters produced at Farm Crest Bakeries. These data had to be fitted to formulation for optimum results. Note similarity among various batter families.

Variety of Cake	Premix Temp. (Deg. F.)	Temp. Out of 1st Tube (Deg. F.)	Final Batter Temp. (Deg. F.)	Back Pressure (Psi.)	Density (Weight Per Gal., Lb.-Oz.)	Air Flow Reading	Motor Load (Amp., 27.2 Maximum)
Gold layers	65-70	75	85	60	6-4	1.75	22
Sponge cake	65-70	80	90	50	5-2	3.00	23
Short cake	65-70	80	92	50	5-2	2.00	23
Jelly roll	65-70	80	90	50	5-0	3.50	24
Gold cup cakes	70-75	85	98	50	6-8	1.00	27
Devils food slice	70-75	85	100	50	5-4	1.50	25
Devils food cup cakes	70-75	85	104	45	6-12	0.75	26

Rising to top, they're scooped out . . .

. . . making A-1 item for candies, pastries

Nut-Meat Bits Now Salvaged by Flotation

Kernel pieces, formerly lost, are separated from siftings by altering specific gravity and using buoying agent—netting association extra $80,000 a crop

A SPECIALLY DEVELOPED flotation process is now being successfully used to recover small pieces of edible walnut meats—formerly sold to oil-extraction plants for a song—from intermingled shells after commercial shelling operations by California Walnut Growers Association, Los Angeles. Recovered pieces of such meats are now being sold to bakers and confectioners.

Key to the new process is an ingenious method employed to alter the specific gravities (initially very similar) of the three components—good meats, poor kernels, and shells—and thus enable "buoying off" of the good meats with the aid of a floatant solution. Basically, it involves drawing air from siftings (small pieces of nuts and shells) in vacuum tanks, adding sufficient water to completely submerge the materials, and then separating the good meats from the poor kernels and shells by flotation.

Need for the Process

In shelling walnuts, the kernels always come apart where the two halves are joined. And in commercial operations using modern machinery, they are broken in many other places. In addition, there is a certain amount of crushing and scuffing of the meats, resulting in a considerable amount of pieces too small to be separated economically from intermingled shell fragments. Prior to the development of the new process, this mixed material was sold to an extraction plant for recovering oil from the meats. The return was only a small fraction of the inherent value of the material as shelled walnuts.

Recognizing the magnitude of the kernel waste incurred in commercial mechanical shelling, James A. Armstrong, chemist and engineer, conceived the idea of recovering walnut meats by a flotation process. He started experiments along this line several years before the war, culminating in a pilot

operation in 1945, and in the Association's commercial operation in 1946.

At the appropriate point in his experiments, he sought to patent the process. However, he discovered that patents covering certain of the principles and methods had already been granted to Felix B. Romberg, of of Holland, Tex. who had directed his work toward pecan-kernel recovery. Armstrong then secured from Romberg the sole right to the latter's methods for application to walnuts and almonds.

On this basis, and with certain improvements and innovations of his own, Armstrong sub-licensed the California Walnut Growers Association to use the method commercially. He supervised the construction of the Association's plant, subsequently maintaining his interest in its operation on a consulting basis.

The apparent specific gravity* of walnut meats and shell fragments is, as stated earlier, essentially the same. Consequently, it is impossible to make a complete separation by means of an air blast. Moreover, when placed in water, some meats sink and some float, and, the same is true of the shell fragments.

Principles Involved in Separation

Reason for this characteristic is that the apparent specific gravity of shells and meats is related to their structure. A piece of good meat, for example, is generally solid. It is composed of some fibrous material and cells filled with oil—the composition being about 60 percent oil and about 40 percent fibrous material that holds the oil cells together. Off-grade, decomposed, moldy or shriveled meats have less oil and relatively more fibrous material.

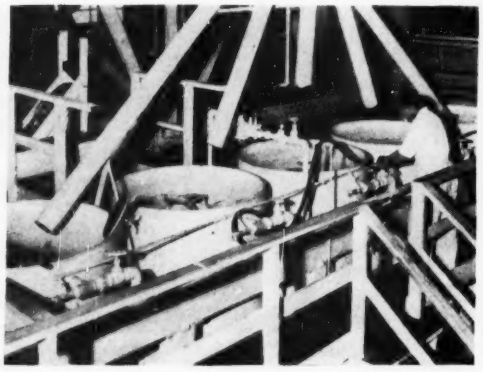
The shell, on the other hand, is practically all fiber or stone cells and associated lignin. It is made up of voids, as compared with oil-filled cells in the meats. These air-filled spaces make the apparent specific gravity of the shell materially less than it would be if these spaces were filled with a heavier substance, such as water.

Approach to the Problem

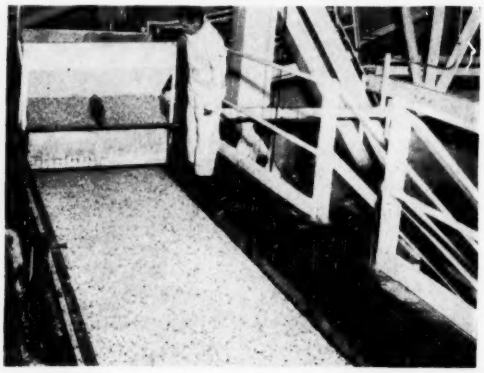
With these properties in mind, it was decided to pump the air out of the cellular and interfragmental spaces of the siftings and fill them with water. Enough water was introduced into the bottom of a vacuum tank until the material was completely submerged—all prior to releasing the vacuum. When this was done, the shells assumed a new

* Apparent specific gravity of solids is defined as the ratio of (1) weight in air of a given volume of the impermeable portion of a permeable material (solid matter including its impermeable pores or voids) at a stated temperature to (2) the weight in air of an equal volume of distilled water at a stated temperature.

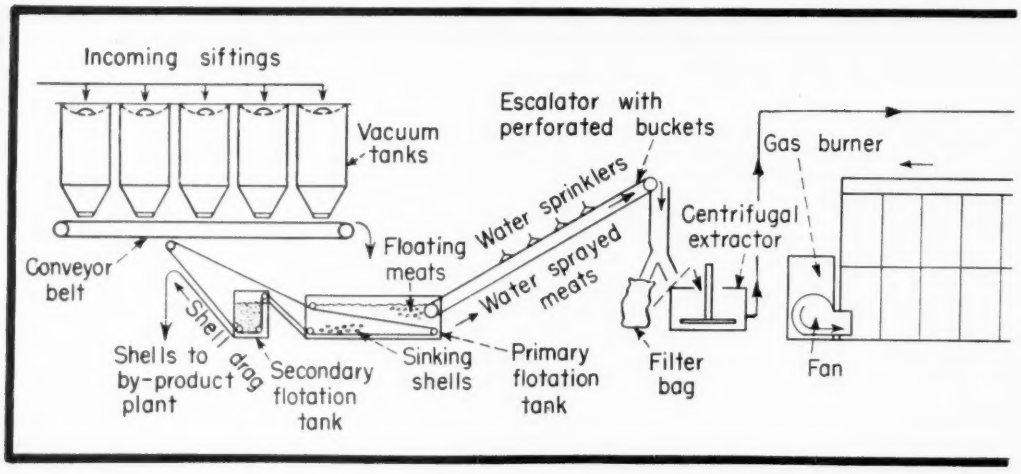
Equipment in Action



SIFTINGS are fed to five tanks, where 28½ in. vacuum is maintained for 1 hr. Material soaks another hour.



AFTER separation from shells in tank, pieces are evenly distributed to dehydrator by this traveling spreader.



apparent specific gravity of about 1.25. However, the sp. gr. of good meats remained at about 1.00. And off-grade meats had a specific gravity somewhere between these two points, but very close to that of the shell.

With these new apparent specific gravities, a very satisfactory separation was possible by using a floatant solution of intermediate specific gravity. By conducting this operation carefully, much of the off-grade meats can be discarded with the shells, thus eliminating the necessity for most of the hand sorting that would normally be required.

Details of Operation

Once these principles were demonstrated, development of the process was simply a matter of selecting suitable vacuum and float tanks, floatant solution, skimmers, shell drags, along with proper equipment for dewatering, dehydrating, grading, blowing, inspection, and packing to keep up with the expected production.

In practice, a vacuum of 28½ in. is generally maintained for approximately 1 hr., with the material left to soak for another hour. Then, the good meats are separated from the shell bits and from the off-grade meats, employing a salt solution ranging in density between 20 and 30 deg. salimeter. Next, the salt solution is washed from the meats, which are then dewatered in a centrifugal extractor, and finally dried in a tipping-tray dehydrator. Drying is completed in about 2 hr. at 145 deg. F.

Resulting meats are graded into eight sizes, each blown separately to remove loose skins and the traces of chaff and light material. They are then given a final inspection and packed in wax paper-lined cartons for sale to confectioners and the bakery trade as "Syruper's Pieces" and "Baker's Pieces."

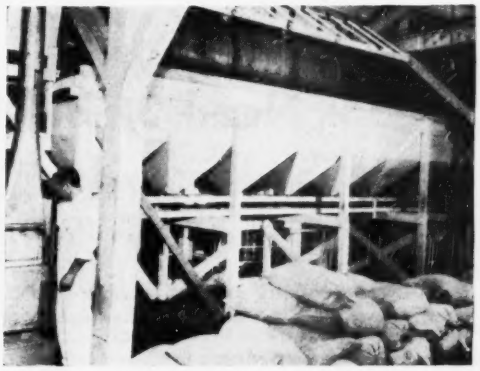
The plant first began operations in July 1946, working on accumulated siftings from the 1945 crop. From three crops—1945, 1946, and 1947—more than 5,500 tons of siftings have been processed. And there were thus salvaged 1,112,879 lb. of edible kernels. This recovery was valued at $236,278 over and above all operating expenses.

The Association—a farmers' processing and marketing cooperative consisting of 11,000 grower-members—handles 85 percent of the California merchantable in-shell crop and about 75 percent of the state's output of shelled walnuts.

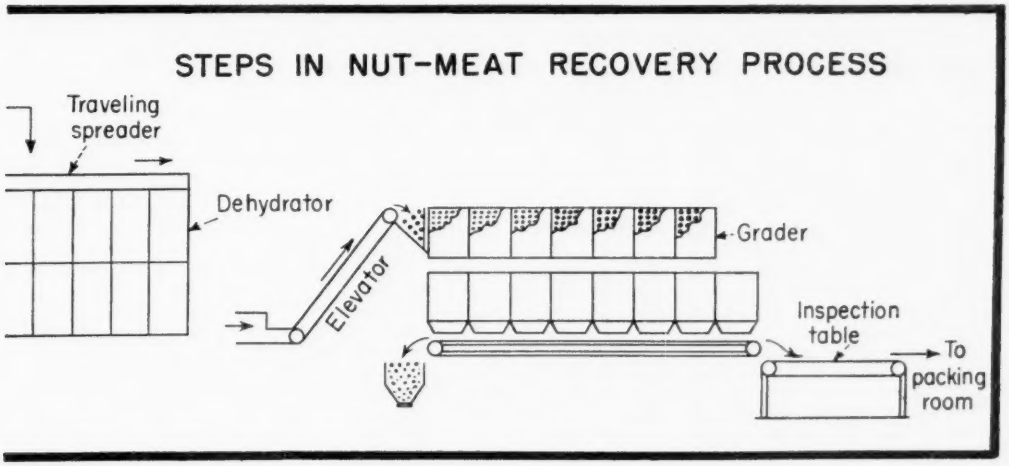
The group is considered one of the country's outstandingly successful farm marketing organizations, with its Diamond Brand internationally known. And it does a business ranging from 25 to 30 million dollars annually.

and Plan of Operation

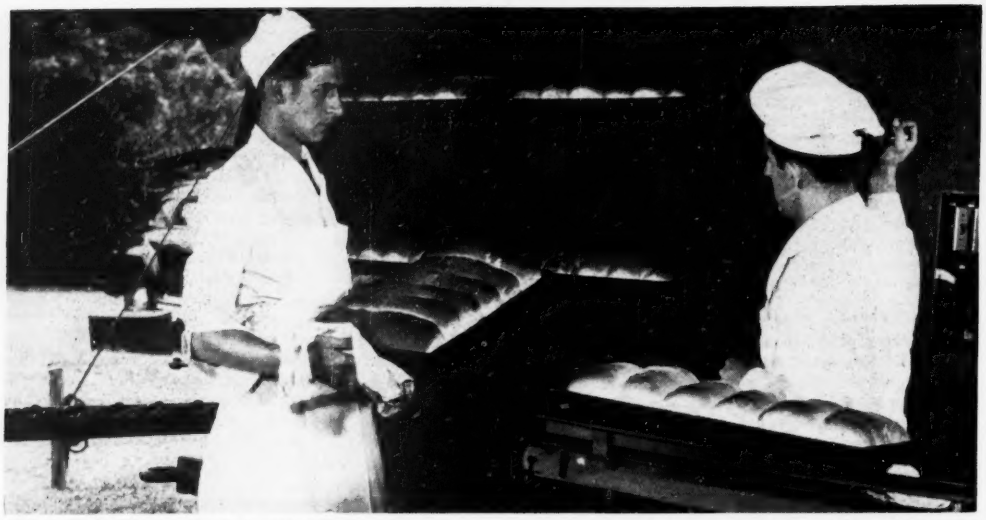
TIPPING-TRAY DRYER removes traces of water from meats. Dehydration takes about 2 hr. at 145 deg. F.



GRADER sorts meats into eight sizes. In this process, remaining loose skins and chaff are removed.



Field Bakeries Do a Good Job Behind the Lines . . .



PRIME TARGETS in combat areas, mobile bakeries cannot provide all products required by front line fighters.

Troops Need Stable Cereal Products

QMC looks to industry to help provide canned and foil-wrapped breads, puddings and other cereal products having greater shelf life and ease of preparation

THEODORE SOLOSKI and CHARLES McWILLIAMS

Cereal & Baked Products Division, QM Food & Container Institute for the Armed Forces, Chicago

Bread, breakfast cereals, cakes, miscellaneous pastries and desserts—familiar, even standard, items in the American diet—are highly popular with the armed forces. And they do not become monotonous with continual use. For those two reasons they occupy a central position among ration components.

The desirability of these foods as ration components, however, is one thing; and adapting them to the strict requirements of military use is quite another. Manufacturers who supply the domestic civilian market are often unfamiliar with the technical problems faced by the armed forces in providing cereal and baked products that will withstand prolonged storage at extreme and often fluctuating temperatures and that will stand up under the type of handling and transportation to which they are exposed in the military supply lines.

■ **Products of current concern to the armed forces are canned breads, canned puddings, mixed cereals, egg noodle and rice products for soup mixes, foil-wrapped bread, prepared mixes, and a wheat concentrate.**

Each of these will be discussed, in turn, in the following text.

Canned Breads

First off, there are several problems to be worked out in connection with canned bread, an item of great potential value in feeding troops remote from baking facilities.

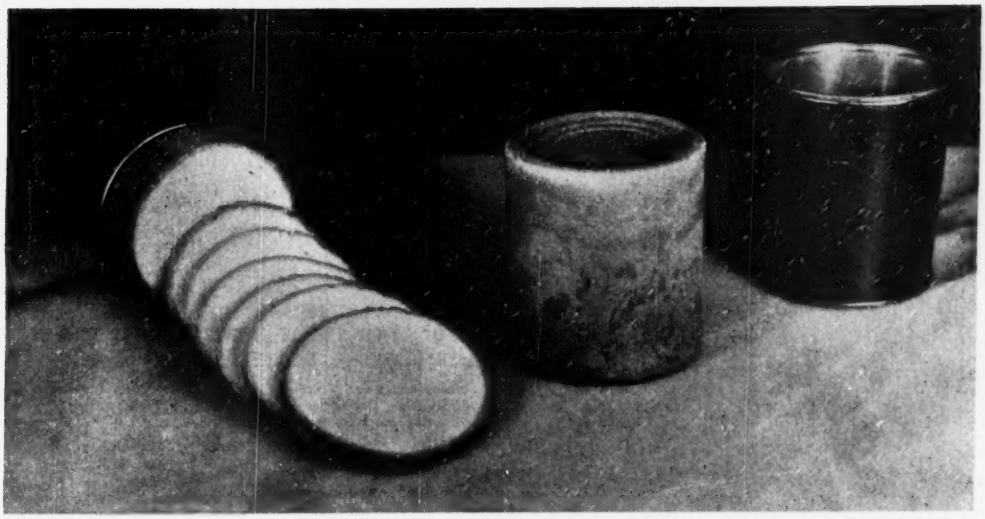
Although the Quartermaster Food & Container Institute has developed a product that retains reasonably good acceptability for long periods of time, this item falls somewhat short of having a bakery-fresh texture, flavor, and aroma when consumed. The great usefulness of this product in operational rations requires that a means be developed for arresting the staling process, which normally occurs in bread. The retardation of staling should have a favorable influence on the texture as well as on aroma and flavor of this canned product. Satisfactory methods of attaining long stability under normal storage are also required.

Still another problem not yet solved is corrosion of the metal containers. The tin can used for containing canned bread has been found to develop rust spots during storage. In most cases, the rust is transferred to the outer crust of the bread, where it causes discoloration on localized areas.

This rust development in no way impairs the nutritive value of the bread, nor does it render the product unfit for human consumption. But the discoloration does make the bread less appealing to the eye and hence subjects the product to possible rejection. For this reason, a means of inhibiting this rust development or arresting the discoloration of the bread crust is being sought. Industrial experience may suggest an approach to solving this problem. Or it may possibly already have the answer.

It is also deemed desirable to develop additional canned bread products, such as canned raisin loaf and a canned whole-wheat loaf, to offer a desired variety in the combat ration.

. . . But Better Products Are Needed for Combat Areas



FRESHNESS in flavor and texture of canned breads offers an important objective for baking industry research.

In planning rations for the armed forces, attention must always be paid to the need for variety. Variety is not only a safeguard against monotony, but is also, in many cases, of advantage in procurement when shortages are a problem.

Canned Puddings

During the recent war, a few canned pudding products were included in operational rations as dessert items. They achieved a high degree of popularity. However, the existing specification for these canned puddings (fig, date, and plum) and for a steamed fruit cake is considered to be inadequate, since specific production formulas are not included. Moreover, the quality requirements of the component ingredients are not clearly specified.

Here, again, the acceptability and popularity of these canned pudding items make it advantageous to have a greater variety of such products. To the existing list, it is therefore desirable to add the following types of canned pudding: Apple, apricot, banana, butterscotch, cabinet, chocolate date, farina, mincemeat, nesselrode, pineapple, tapioca, orange nut roll, and cherry cobbler.

In the development of this series of canned pudding products, there can be great aid through cooperative research and development among commercial manufacturers of canned pudding items.

Mixed Cereals

During the recent war, mixed cereal products (composed of ready-to-eat cereals, sugar, fat, and non-fat dry milk solids) were found to be highly acceptable in providing troops with breakfast cereals and dairy products. They were consumed both as a cereal food and, in compressed form, as a dessert item. Because of this high degree of acceptability and popularity, a greater variety of mixed cereal products is desired. A corn and soya cereal, malted wheat granules, or malted wheat flakes would be acceptable additions to the list. And there are other possibilities.

Cooperative research with manufacturers of ready-to-eat breakfast cereals is needed to assure that full advantage is taken of recently developed ready-to-eat cereal products adapted to use in mixed cereals.

Soup Mix Materials

In the development of specialized operational rations, such as those for use in areas of extreme cold, an instantly rehydratable soup mix will be of great usefulness under the conditions likely to be encountered in such regions. Tests conducted on mixes of this type have shown that the inclusion of material such as egg noodles and rice, which will add body and substance to the soup, would enhance considerably their acceptability. Because of the difficulty of preparing a hot soup under combat conditions, when cooking facilities are inadequate, it is necessary to develop an egg noodle and rice product that will be rehydratable with the simple addition of boiling water. The resulting product must, of course, be palatable and nutritious.

Current research conducted at the Quartermaster Food & Container Institute has reduced substantially the cooking requirements of specially modified egg noodle and rice products. Additional cooperative research among commercial manufacturers will be needed if the manufacture of such products is to be fully effective.

Special Ration Units

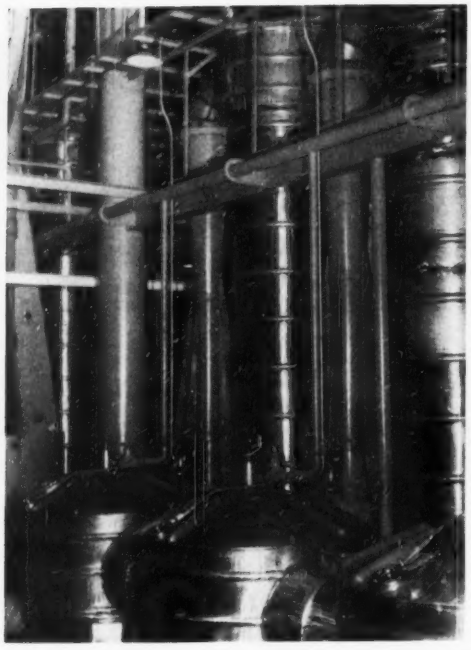
In the development of special packs such as the emergency rations, compactness for the purpose of saving space is an extremely important consideration. Since cooking facilities are either very limited or totally unavailable, the inclusion of food components acceptable in the cold state is desirable. And high stability is a basic requirement.

Food components that can be processed, comminuted and compressed into bars to comply with these requirements are under development. But co-

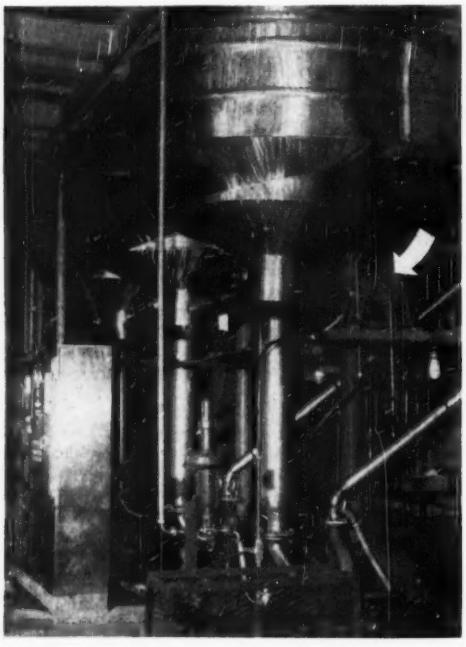
(*Turn to page* 170)

Research Challenge

Critical research problems for baking technologists in particular and cereal chemists in general are spotlighted in this seventh of the QM series—which takes on a new note of challenge to the industry as grave events in the Far East put accent on the need of adequate foods for our fighting men.



TOP PART of new thermocompression evaporator at Pasco. Vapor separators (bottom), vertical heaters, and jet boosters extend above second floor.



BOTTOM VIEW of evaporator, showing vapor separators with spiral shell construction that contributes to efficiency. Important part of automatic control system is newly developed density controller (arrow).

New Evaporator Robotized For High Output, Efficiency

Density detector developed to put large concentrators of novel design under complete control. Operating data show low-cost performance

C. D. ATKINS, F. W. WENZEL, ELLIS FEHLBERG, and LLOYD E. SLATER

Messrs. Atkins and Wenzel are with the Florida Citrus Commission, Lake Alfred, Fla.; Mr. Fehlberg is associated with Pasco Packing Co., Dade City, Fla.; and Mr. Slater is with the Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Salient features of the new high vacuum, low temperature evaporators, recently installed at Pasco Packing Co., Dade City, Fla., for production of concentrated citrus juices are: Introduction of juice through a spiral shell that prevents splashing, and completely automatic control over the operations.

Juice and hot vapor temperatures are continuously recorded to provide a constant check on the balance of the system. Absolute pressures throughout the system are shown by a multi-tube mercury column manometer.

Two of the units, constructed in the shops of the Pasco plant from the Florida Citrus Commission design• developed in the pilot plant of the Citrus Experiment Station, Lake Alfred, Fla., produce 1,174 gal. per hr. of 42 deg. Brix concentrate. Each evaporator has a vapor removal capacity of 14,500 lb. per hr. when operating at 70 deg. F.

Cost of evaporation, based on operation since Jan. 1950, and including electricity at 1c. per kw. hr., steam at 60c. per 1,000 lb., and water at ½c. per 1,000 gal., amounts to 1.7c. per gal. 42 deg. Brix concentrate.

The following steps are involved in preparing the frozen concentrate: Production of the best possible juice from a suitable mixture of fruit under sanitary conditions; deaeration and chilling prior to concentration; concentrating by evaporation under vacuum at low temperature; restoring the natural flavor and aroma by addition of fresh juice to the concentrated product; further freezing of the juice to a slush; filling into 6 oz. cans; hermetically sealing the containers under vacuum; freezing the contents, and casing of the canned product for storage in the frozen state.

Juice Preparation

Properly blended fruit are conveyed through washers equipped to rotate them and distribute germicidal agents and detergents on their surfaces. A final check for bruises or over-ripe condition is then made on a large continuous inspection belt. After being machine-sorted for size, the fruit goes to Food Machinery extractors. From these units the juice flows through stainless steel troughs to the finishers. One of the latter units is equipped with a screen having minute perforations which permits juice to flow to the evaporative deaerator. The second finisher removes the long delicate juice sacs from the mixture of seeds and pulp and discharges these sacs, together with a small portion of

• See "Report New Technical Strides in Design of FCC Evaporator," p. 56, Aug. FI.

juice, to a refrigerated vacuum holding tank for addback to the concentrated product.

As the juice, which is to be concentrated, enters the evaporative deaerator it is led around the inside wall of the unit. Air, and a portion of the water, is removed by a steam jet booster, with a consequent reduction of juice temperature to approximately 50 deg. F. The deaerator's capacity of 2,000 gal. permits blending of juice from fruit that may vary slightly in solids or acid content. Juice is pumped from this unit to the first stage of the evaporator at a rate of 2,127 gal. per hr.

How the Evaporator Works

A 3-stage thermocompression evaporator is used for concentration of the juice. Advantages of this unit are: Use of vapor removed from the juice as a source of latent heat, low temperature of operation, and the relatively small quantity of partially concentrated juice that is held in the unit during continuous operation.

Vapor removal of 14,500 lb. per hr. is accomplished by the use of Ingersoll-Rand boosters, operating at a suction temperature of 70 deg. F. In the first stage, 5,952 lb. per hr. of vapor are removed to give a partially concentrated juice of 18 deg. Brix. The second stage removes 4,800 lb. per hr. of vapor from the 18 deg. Brix feed to yield a concentration of about 29 deg. Brix. The third stage removes 3,748 lb. per hr. of vapor to produce a concentration of 55 deg. Brix.

In each stage, 2,600 lb. per hr. of the vapor is combined with 3,450 lb. per hr. of motive steam, furnished the thermocompressor, to supply 6,050 lb. per hr. of heating vapor. The barometric booster removes 6,700 lb. per hr. of vapor at 70 deg. F., in excess of that needed for furnishing heat of vaporization to the juice. Compressed vapor from the booster is liquefied in the barometric condenser by 1,600 gal. per min. of water at 74 deg. F.

Individual Pumps Circulate Juice

Circulation of partially concentrated juice (at the rate of 300 gal. per min. per stage) is provided by individual centrifugal pumps. Here, juice is drawn by pump from the collector at the bottom of the vapor separator chamber and forced upward through a tubular preheater and into the tube nest. Distributors in each tube direct the juice against the walls, thereby speeding heat exchange.

The rapidly traveling juice and vapor enter the separator chamber and the liquid flows into the collector chamber for recirculation through the heater. The vapor moves upward to the booster suction and is removed from the separator. Carryover of juice particles is negligible because of the centrifugal action of the vapor within the chamber.

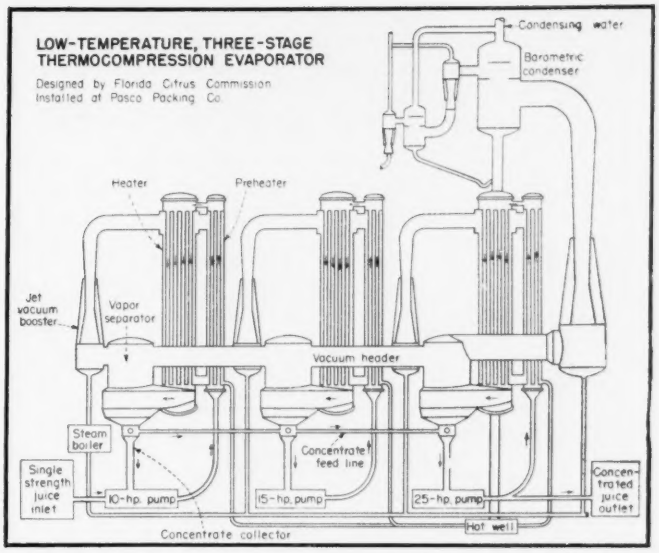


DIAGRAM of Pasco low-temperature evaporator, designed by Florida Citrus Commission. Vacuum is maintained by barometric condenser and jet boosters. Juice is pumped through vertical tubular preheaters and heaters, and vapor is removed in separator. Pumps recirculate juice in each stage. Concentrate feeds from stage to stage by gravity.

Final Processing

To prepare the 42 deg. Brix concentrate for freezing, about 402 gal. of 12 deg. Brix juice is added to the 772 gal. of 55 deg. Brix concentrate discharged hourly from the two evaporators. This blending is carried out in four 600-gal. agitator equipped, jacketed, and ammonia-refrigerated tanks. The concentrate and add-back juice are fed into each tank simultaneously. During filling and blending, the temperature of the concentrate is reduced to about 25 deg. F.

The 42 deg. Brix concentrate is pumped from the blending tanks to a 3-stage Votator, where the temperature is reduced to between 16 and 18 deg. F. Then the concentrate is put into 6-oz. cans by positive-displacement Pfaudler fillers, and a steam flow closing machine completes the job at the rate of 350 to 450 cans of concentrated juice per min.

Freezing Procedure

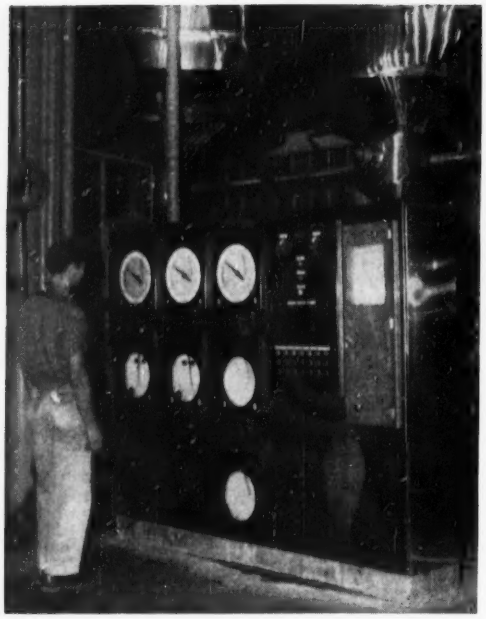
Cans are now conveyed through an immersion freeze tunnel at temperatures of 0 to −5 deg. F., then are automatically cased, 24-6 oz. cans to a carton, and conveyed to the refrigerated storage room. In the storage room (200 ft. wide by 350 ft. long) the cases are stacked 20 ft. high in orderly arrangement upon wooden pallets. The cold room is maintained at 0 to −10 deg. F.

Automatic Controls Assure Efficiency

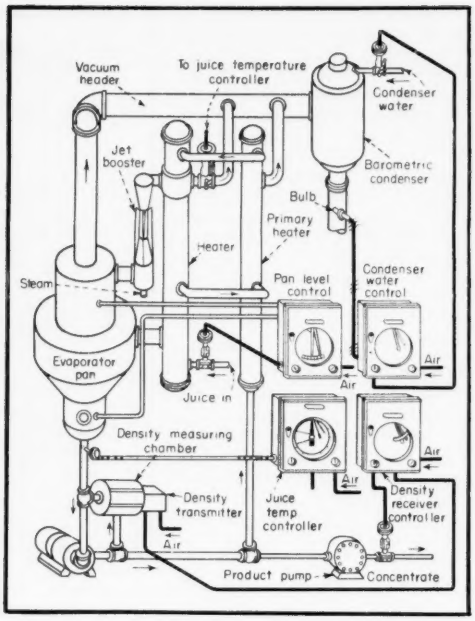
The two evaporators at Pasco Packing Co., producing 1,174 gal. 42 deg. Brix concentrate per hour, are operated by one man. This low-cost operation is largely due to the unique system of automatic controls installed by Brown Instrument engineers. Accurately regulated are: Density of the concentrated juice; liquid level in the evaporators, by controlling the supply of fresh juice; and temperature in each of the three stages of the two evaporators.

The juice temperatures and hot vapor temperatures are continuously recorded to provide a constant check on the balance of the system. Absolute pressures throughout the system are shown by a multi-tube mercury column manometer.

Probably the most important instrument on each evaporator is the newly



INSTRUMENTS for each of Pasco's three-stage evaporators are concentrated on convenient panel.



SCHEMATIC diagram of evaporator control system, an outstanding feature of Pasco installation.

developed density controller—the unit that precisely controls concentration of the final juice at 55 deg. Brix, plus or minus 0.1 deg. Brix. This instrument is comprised of four separate units: (1) A chamber through which a portion of the concentrated juice continuously passes; (2) a submerged displacer or float; (3) a pneumatic balance unit; and (4) an instrument which measures buoyancy of the float.

This unit operates on the principle that the buoyancy of an immersed body is equal to the weight of the liquid displayed by it. Thus, if the weight of the surrounding fluid changes, the buoyancy of the submerged float is altered by a corresponding amount.

Accurate measurement of buoyancy requires that there be no change in the position of the float, or that such a change be corrected by the time the measuring system regains its equilibrium. The pneumatic balance unit fills this need by applying pressure to the connecting arm of the float to bring it back to the proper position before the system regains its balance.

Movement of the float rotates a lever in the balance unit, which then actuates a pilot valve to change the air pressure in a pneumatic bellows. This establishes an equilibrium between the force exerted by the bellows and that exerted by the float. Since buoyancy of the float is a function of the density of the medium in which it is immersed, measurement of this air pressure is an accurate gage of the specific gravity of the juice in the sampling chamber.

The density controller (calibrated in degrees Brix) is connected pneumatically to the bellows of the balance unit. When the control index of this instrument is set at the desired Brix, the output air pressure varies with any deviation in juice density. This causes an air-operated diaphragm motor valve to vary the amount of juice leaving the evaporator in such a manner as to keep the density of the concentrated juice at precisely the point set on the controller.

Liquid Level Control

Juice level in the three stages of the evaporator is controlled by a single unit that regulates admission of fresh juice to the first stage. This instrument measures, by means of air-purged pressure taps, any variation in pressure caused by the liquid head in the first stage. And by a Saunders patent-type diaphragm motor valve, it controls the admission of juice to maintain a constant level.

Temperatures Recorded

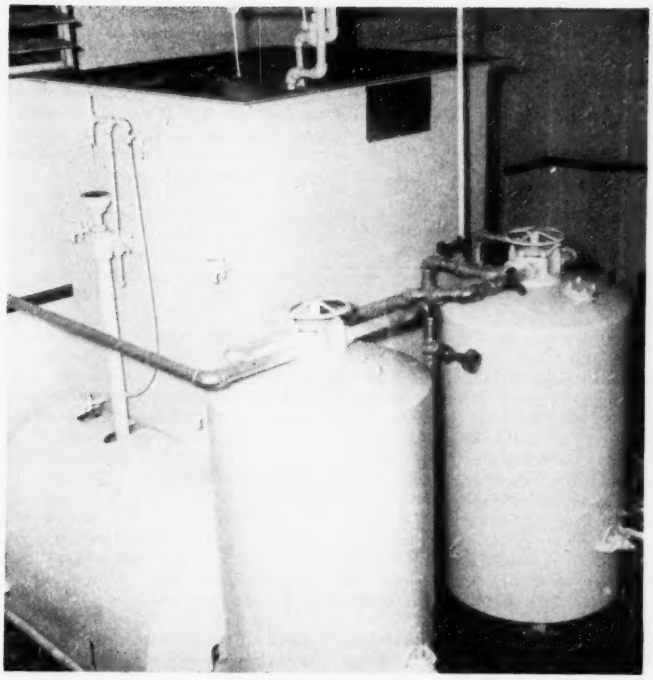
In each stage of the evaporator, temperature of juice is measured by an electronic potentiometer, connected with a thermocouple located in the outlet at the bottom. The small mass of the thermocouples used insures instantaneous response to minor temperature changes.

Another section of the evaporator in which the temperature must be closely controlled is the barometric condenser. While a sufficient amount of water is necessary to maintain the required vacuum, use of too much water results in low juice temperature, thus reducing the capacity.

An indicating thermometer with pneumatic control measures the temperature of the water in the barometric leg and, through an air-operated butterfly valve, adjusts the flow of cooling water to keep a constant temperature. It has been found that this control maintains a constant vacuum and desired juice temperatures.

To check over-all efficiency, a three-pen recording thermometer was installed to measure temperature of the vapor leaving each of the three jet boosters. Indicators are the temperatures on the hot side of the juice heaters.

This complete, integrated control system aids in efficient production of a high quality product. It eliminates the need for periodic checking of temperatures and manual sampling of the concentrate, which can only detect variations after they have taken place. A minimum of supervision is required, and the centralized control panel permits the single operator to check vital conditions quickly.



WATER for bottling is continuously dealkalized in this Permutit lime-treating installation. In background is precipitator. Tanks in foreground are Neutralite filter (left) and activated carbon unit (right). Driving motor and pump are under hood at left of precipitator tank.

Lower the Water Alkalinity To Raise Beverage Quality

A really good soft drink must have a blend that's balanced. This calls for maintaining the proper acidity—by making sure your bottling water is soft and crystal clear

J. R. HALL
Treasurer and Chief Chemist,
The Red Rock Cola Co., Atlanta, Ga.

Reduction of excessive alkalinity in water for carbonated beverages assures a standard acidity in the finished drink, maximum emphasis on the desired flavor with a great improvement in the aftertaste, and elimination of expensive bacterial spoilage of finished goods.

In certain sections of the United States, particularly in the Midwest and Southwest, many city water supplies contain enough alkalinity to neutralize all of the acidity of certain drinks and at least 75 percent of that present in most acid type beverages. For this reason, it is suggested that all bottling waters containing more than 3 gr. per gal. alkalinity be treated to reduce this condition if the best quality beverages are to be manufactured.

Carbonated beverages contain a balanced blend of sugar, flavor, acidity, and carbonation that has been carefully worked out to give the customer the desired taste effect. Neutralization of the normal beverage acidity by alkalinity in the bottling water removes a portion or all of an essential ingredient—the acidity—one part of this carefully balanced blend of sugar-flavor acidity-carbonation.

If this balance is changed by the destruction of all or a part of the acidity, then a significant change in taste has been made. A highly acceptable beverage may be and usually is made less acceptable to the consumer. Also, as a minor point: With local variations in water alkalinity, the beverage being sold under the same name in different cities, will vary widely in taste.

Not only will the lack of acidity affect the taste, but there may be enough of the neutralization products formed to produce an off-flavor. Depending upon whether citric or phosphoric acid was used in the syrup, there will be equivalent amounts of sodium, calcium, or magnesium citrates, or sodium, calcium, and magnesium phosphates formed in the beverage.

Bacteria and Yeast May Grow

Neutralization of beverage acidity may permit growth of bacteria and yeast in beverages, with consequent loss from spoilage. For example, a cola beverage with a normal pH of 2.42 to 2.50 is so acid that neither bacteria or yeast can grow in it. If the acid in this drink is neutralized to such an extent that the pH becomes 2.8 to 3.2, then, under favorable conditions, considerable growth of yeast may occur. Bacteria will not ordinarily grow at this pH, but if the alkalinity of the water is such that the beverage pH lies in the range of 3.8 to 4.4, then bacterial growth may be expected. It should be said here that a cola beverage with a pH of 2.8 would certainly not be considered an acceptable product, much less one with a pH of 4.40.

This flavor defect is apparently of more concern to cola bottlers than growth of bacteria and yeast. For example, over 25,000 samples of cola beverage have been examined in the writer's laboratory in the past 10 yr., and not one, as far as can be recalled, was found to be spoiled because of the growth of yeast or bacteria. There is good reason to believe that the high acidity (low pH) of cola beverages is sufficient to prevent spoilage under almost any conditions unless the usual beverage acidity is destroyed by excessive water alkalinity. The same statement could be made about other beverages, such as cherry, or lemon phosphate drinks, with the same pH due to presence of phosphoric acid.

Alkaline waters seem to possess a definite off-taste, and this is especially noticeable in the aftertaste of the beverage. The flat, brackish taste is covered up to a certain extent by carbonation, flavor, and the beverage acidity,

Drink's Balance Is Upset . . . and Faster on Phosphoric Than Citric

TABLE I—How Citric Acid Type Beverage Is Affected by Various Water Alkalinities

Bottling Water Alkalinity (Gr. Per Gal.)	Beverage pH Found (25 Deg. C.)	Percent Effective Acidity Destroyed
0	2.70	0.0
5	2.88	16.0
10	3.07	26.7
15	3.29	37.8
20	3.50	47.2
25	3.75	58.9
30	4.03	70.0

TABLE II—How Phosphoric Acid Type Beverage Is Affected by Various Water Alkalinities

Bottling Water Alkalinity (Gr. Per Gal.)	Beverage pH Found (25 Deg. C.)	Percent Effective Acidity Destroyed
0	2.42	0.0
5	2.56	32.5
10	2.77	54.3
15	3.09	77.1
20	3.88	96.4
21.2	4.42	100.0
25	5.91	——

or what is left of it, but the residual off-taste remaining in the drinker's mouth is very noticeable.

A really good acid-type carbonated beverage should have a slightly tart aftertaste. And it is almost impossible to obtain this with a beverage made with water containing moderate or high alkalinity, even if additional acid is added to the syrup.

Effect of using waters containing various amounts of alkalinity is shown in Tables I and II. Data in Table I were obtained by making laboratory tests on a typical grape soda water made with citric acid. The syrup contained 4 oz. grape flavor and 2 oz. 50 percent citric acid solution per gal. of 33 deg. Be' syrup. The syrup throw was 2½ oz. to a 12 oz. bottle. Various test beverages were made from artificially prepared waters, containing the indicated amounts of alkalinity. All pH values were determined by the use of an electrometer at a standard temperature of 25 deg. C.

Data given in Table II were obtained in the same way, but using a typical cola beverage instead of a grape flavored drink. Enough phosphoric acid was added to give a beverage which, when made up with distilled water, had a pH of 2.42. It will be noted that more of the acidity was destroyed in the beverage containing phosphoric acid than in the one with citric acid.

In the third column of each table, an arbitrary term, "effective acidity," is used to illustrate the significant changes that are produced by differences in the alkalinity of the bottling water. Effective acidity is quite different from actual beverage acidity as determined by titration with a standard alkali solution or by other analytical methods. The term is used to describe that portion of the acid content of the beverage that can be tasted, or that effects the taste under the ordinary drinking conditions. The method used to determine the loss of effective acidity was also arbitrary, and was chosen to show that bottling waters containing up to 25 or 30 gr. per gal. alkalinity destroyed significant percentages of the acid present.

A pH range of 2 units was adopted as the effective acidity for any beverage. If a beverage made with distilled water is found to have a pH of 2.7, as shown in Table I, then the effective pH range varies from 2.7 to 4.7.

There were two principal reasons for choosing this range: (1) A pH of 2.7 indicates 100 times as much active acidity, or hydrogen ion concentration, as does a pH of 4.7; and (2) an increase of 2 pH units in an acid beverage will place it in the range of a nonacid beverage. (Nonacid beverages, such as cream soda or root beer, usually have pH's of 4 to 5, and occasionally run as high as 6.) In choosing this pH range, the area was selected where the acid type differs from the nonacid beverage because of acid in the syrup.

To obtain the values given in the tables, two typical beverages were made with distilled water and their pH's were determined. Then, by suitable experiments, the quantity of standard alkali solution required to raise the pH by 2 units was found. This quantity represented the amount of alkali needed to neutralize 100 percent of the effective beverage acidity as defined.

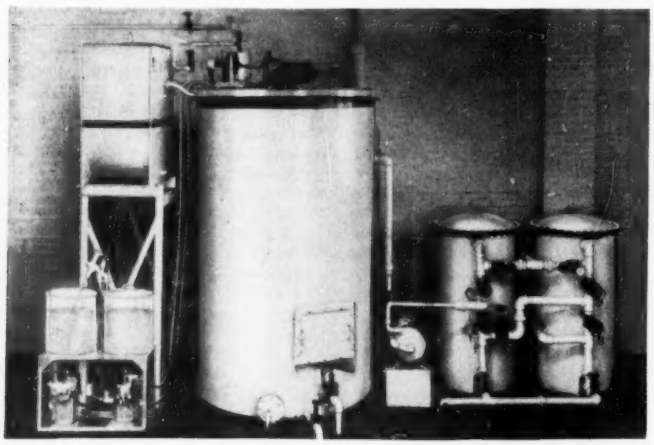
Other experimental beverages were prepared containing varying quantities of alkali solution ranging from 10 to 100 percent of the above determined amount. The pH values of these beverages were obtained and plotted on graph paper. Instead of the usual curve, a vertical axis was drawn through each point. Then the pH values in the second column were plotted on the same graph, and a curve drawn through these points as usual. The percentage neutralization for the beverage made with water containing 5 gr. per gal. was obtained by interpolation between the two nearest vertical axes. Neutralization values for the other test beverages, obtained in the same way, were listed in the last columns. This procedure had to be repeated, of course, for each beverage, since the neutralization percentage varied with each acid.

Treatments Reduce Alkalinity

The alkalinity of any water supply may be reduced to a more suitable level in several ways: (1) By treatment with lime and a suitable coagulant in either the batch or the continuous type equipment (occasionally other chemicals such as chlorine or calcium chloride must be used to obtain the desired results); (2) by passing through a hydrogen zeolite-type of ion exchanger (cation exchanger) alone, or in conjunction with an anion exchanger; or (3) the less desirable practice of adding additional acid to the syrup.

The lime process dealkalizer is preferable for most bottling plant installations, especially where the alkalinity of the water supply varies only slightly from day to day and there are no rapid changes within a space of a few hours.

In an accompanying photo, a small batch-type lime dealkalizer is illustrated, together with the necessary sand and gravel filter and the activated-carbon unit. The required lime and



BATCHES of lime dealkalized water are made in this Infilco assembly. Chemical solution jars are at left, accelator in center, and filters on right.

other chemicals are mixed with water in the solution jars (seen in left foreground) and added to the raw water in the large tank (center), where it is thoroughly mixed. The water must be permitted to stand quietly for 2 to 4 hr. in order to allow the insoluble sludge to settle out. The clear dealkalized water can then be drawn off at the top of the tank.

The principle of the lime-type dealkalizer is that the chemicals added to the raw water combine with the alkaline compounds to form compounds that are insoluble in the water. After these settle, the treated water is removed by decanting, or the insoluble compounds are taken out by filtration. In the batch-type dealkalizer sufficient tank or storage capacity must be available to provide the necessary quantity of treated water for an entire day's operation of the plant.

There are also the continuous type lime dealkalizers. On one, the necessary chemicals are added in the center section of an accelator tank with agitation, the insoluble compounds are precipitated as a sludge in the bottom of the tank, and the clear dealkalized water can be removed continuously from the top of the outside section of the center tank. It is filtered and treated with activated carbon, in a purifier, and is then ready for use in bottling.

In another continuous type of lime dealkalizer (see photo at start of article), chemicals are added at the top of the first section of a three-zone tank equipped with an agitator. Insoluble compounds are precipitated as sludge and the clear dealkalized water passes through an overflow into the third, or clearwell, section. Water, drawn off from the bottom of this section, is then filtered and treated with activated carbon to prepare it for bottling.

Theoretically, the lime-type dealkalizer can remove water alkalinity to about 1½ gr. per gal., but in actual practice it usually runs as high as 2½ to 3½ gr. How much the alkalinity can be reduced with this equipment depends upon a number of factors—the nature of the compounds found in the water, the care and skill of the operator, the water temperature, and the retention time in the batch process.

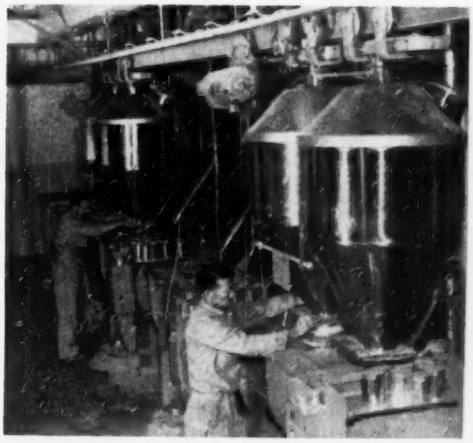
The cation, or hydrogen-zeolite-type of ion exchanger, has been used to a considerable extent in the bottling industry in the past few years. Its initial cost is considerably less than the lime-type dealkalizer, but it has some disadvantages. For example, there are off-tastes in finished beverages due to careless or improper operation, and there is corrosion of equipment.

Cation exchangers are similar in appearance to sand and gravel filters, but in place of the sand, a special zeolite material is used. When water passes through the zeolite bed, the sodium, calcium, and magnesium ions are exchanged for hydrogen ions present in the bed. The water, having lost its alkaline ions, now becomes acid. Effluent from the exchanger is then mixed with the correct proportion of raw, alkaline water to produce a mixed water which is slightly alkaline. This is done by means of a special mixing valve that proportions the flow of raw water to treated water.

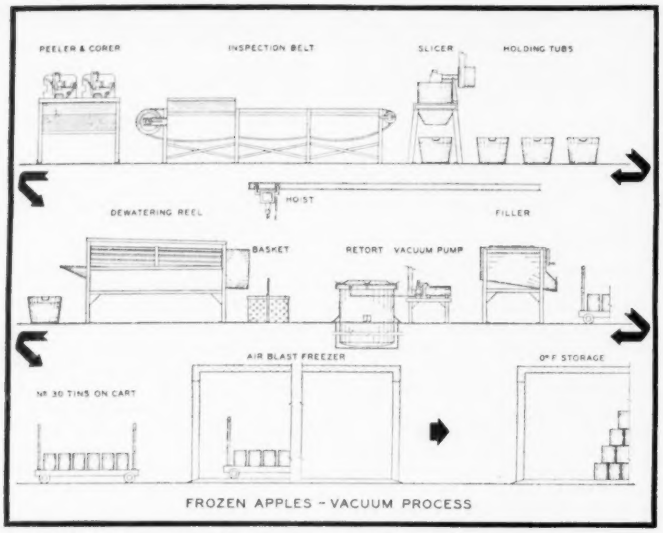
The equivalent of distilled water, having no alkalinity and very low total solids, can be obtained by using two different types of ion exchangers in series. The raw water is first passed through the cation exchanger described above, then is put through a similar unit containing another type of zeolite material that removes the acid or anions from the water. The second piece of equipment is called an anion exchanger. Thus, the two types of zeolite beds, used in series, produce the equivalent of distilled water—and at a considerable saving in cost.

It is to be noted that both exchange beds become exhausted with use and must be revived by treatment with the required chemical. Such units have been in use industrially for some time but, as far as is known, they are not widely used in the bottling industry.

DOUBLE PLAY: Measured Into Bin, 'Railed Right to Mixer



SPEEDY routing features advanced system of proportioning and blending of Jello at General Foods' new San Leandro, Calif., plant. Pictured above: Operator presses pushbutton and ingredients are automatically measured into two stainless steel containers inside conical monorail car. Then, a press of another pushbutton sends car to one of three blending lines. Right: After clearing switch from main line, monorail car stops until needed. When ready again, operator pushes manual-button control to start motor that moves car above one of the mixers. After it is properly positioned, attendant then pulls slide-valve at bottom of containers, and ingredients flow into mixer. Finally, blended dessert mix is dumped into bin below mixer, from where it feeds to packaging line.



SKETCH-BRIEF gives quick perspective of steps. Apples from 35 deg. F. storage are peeled and cored, inspected for defects, sliced, and held in brine. After draining, slices go into retort basket, are vacuumized in 30 percent sucrose solution, packed in 30-lb. tins, covered with 40 percent syrup, and frozen.

Vacuum Treatment Curbs Browning of Apple Slices

Method uses sucrose syrup fortified with ascorbic acid. Yields bright, natural colored, full flavored, firm textured slices that retain color

P. D. RODGERS, J. B. WEGENER, and B. H. BAER

Food Processing Section, Division of Agricultural Relations, Tennessee Valley Authority, Knoxville, Tenn.

An improved method for controlling enzyme activity and browning in apple slices for freezing or canning has now been "proved out" by successful use for several seasons in Tennessee Valley commercial plants.

This new technic calls for vacuum treatment of the apple slices in a sucrose solution fortified with ascorbic acid. It was developed at the food processing laboratory of the Tennessee Valley Authority in cooperation with the Georgia Experiment Station.

The treatment does not leach out the flavor or break down the texture of the apples as does a steam blanch. Nor does it have the disadvantages of the sulphite treatment, where flavor is also affected and corrosive byproducts are given off during cooking.

In the new practice, apple slices are subjected to a 26-in. vacuum for 25 min. while submerged in a 30 percent sucrose solution containing 0.1 percent ascorbic acid. Vacuum is then released and the slices are drained, placed in suitable containers, covered with a 40 percent sucrose syrup, and frozen. For canning, the treated slices are packed in cans, water is added, the containers closed and sterilized.

Careful control of the syrup and acid concentrations are necessary to assure a product free from browning. It was found that the 30 deg. Brix syrup was diluted to about 27 deg. Brix by juices drawn from the fruit each time. The concentration was adjusted to 30 Brix by adding sugar.

Depending on the variety and maturity of the apples, the volume of liquid sometimes increased until it was necessary to withdraw syrup to avoid an excess in the retort liner. The slices either lost some weight or remained about the same after submersion.

In the 1947 operation, 1/3 of the initial amount of ascorbic acid was added to the bath after each batch of apples was processed. This was based on earlier work done in the TVA laboratory which indicated a 33 percent loss on each batch. During 1949, this laboratory made determinations for the commercial operator, and found that losses were 10 to 12 percent instead of the 33 percent originally found. On the basis of these findings, it was recommended for this operator that 10 to 15 percent of the original weight of ascorbic acid be added after vacuumizing each 350 to 400-lb. batch of apple slices. Ascorbic acid determinations were made using a Lumetron colorimeter and sodium 2, 6 dichlorobenzenoneindophenol dye.

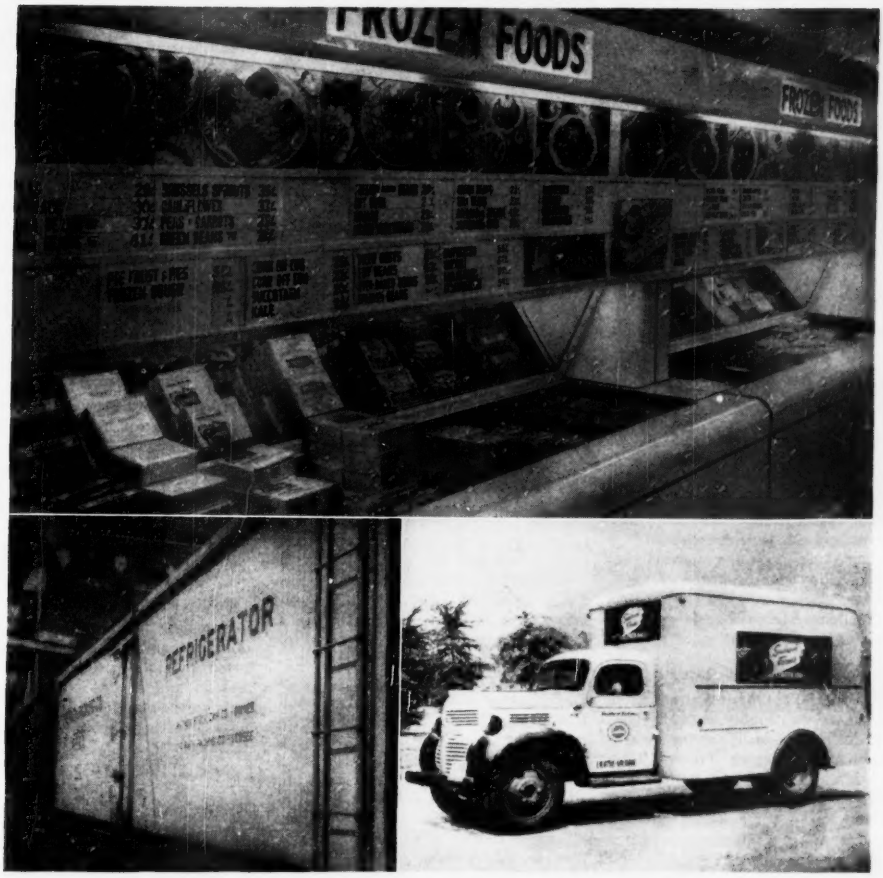
Brine Vacuuming Tried

With harvesting of the 1949 crop of Golden Delicious and Winesap apples, one commercial operator decided to compare the above described treatment with an earlier-developed method on which the patent had recently expired. Costing less, this technic specifies a 5 percent sodium chloride brine containing 1 percent citric acid for the vacuuming bath. Otherwise the procedure was identical with the new syrup bath method. The brine solution was checked with a salometer and a small amount of sodium chloride was added whenever necessary. Citric acid level was checked by titrating the bath solution with N/10 sodium hydroxide. It was found necessary to add 4 to 5 oz. of acid to every second batch in order to maintain the desired level.

Organoleptically it was noted that both syrup and brine vacuumizing methods yielded a finished product of bright, typical color and a slightly translucent appearance. Texture of both slices was firm, but the brine samples tasted slightly salty. Because of the difference in flavor, the syrup treatment was judged as giving a better quality product. However, it does cost 2 to 3c. more per lb. to produce.

To check effectiveness, both drained and syrup covered slices were left overnight at room temperature and for three days at 40 deg. F. No browning was noted in any of the samples. Therefore, it appears that the vacuumizing treatments prevent discoloration long enough for any practical use in processing apple slices.

A SPECIAL FOOD INDUSTRIES REPORT



Frozen Food Distribution

Up to Now It Has Cost Too Much

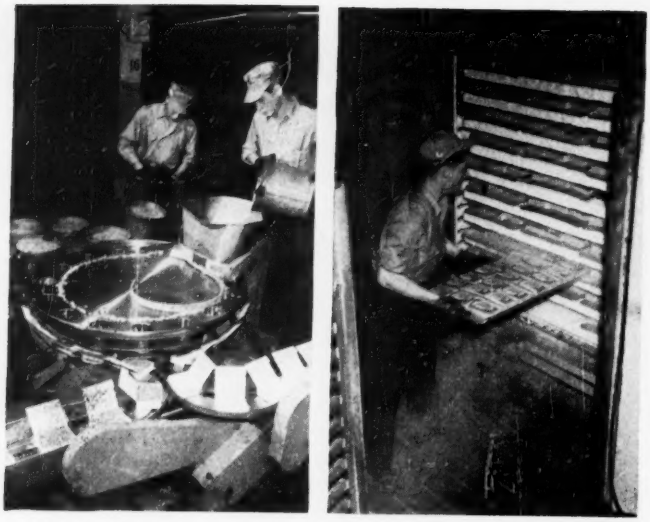
And the cooperative efforts of the entire industry, from packer to final distributor, will be required to do anything effective about it. . . . This report may sting, but it also points up some of the necessary "first moves"

GERALD A. FITZGERALD
Frozen Food Consultant, Fayetteville, N. Y., formerly, secretary, Frozen Food Foundation

Everyone admits that distribution of frozen foods costs too much. Most wait for the other fellow to do something about it. Many really feel that nothing decisive can be done about it.

Accordingly, this analysis is presented as a starting point for a more exhaustive study of what actually might be accomplished in this salient field.

High cost of distributing frozen foods is, of course, due solely to the necessity of merchandising them in the frozen state. They are protected against deterioration only so long as they are



PROCESSING costs for frozen foods compare favorably with those for canned goods and are now at about as low a percentage of total costs as they are likely to get. Here, peas are packaged (left), then frozen (right).

frozen properly in the plant and kept at adequately low temperatures during the long trek to the consumer—a period of many months on the average. Moreover, turnover must be faster than for equivalent canned products because of poorer retention of quality even in frozen storage.

The frozen food industry has passed the 1,000,000,000-lb. annual-production mark. It takes roughly a ton of refrigeration to freeze a ton of frozen foods or approximately 500,000 tons of refrigeration for freezing 1,000,000,000 lb. At a minimum figure of $200 per ton average first cost, this represents an investment in freezing equipment alone of $100,000,000.

As to storage, it is estimated that as much as 500,000,000 cu. ft. of gross warehouse space has been made available for frozen foods. At a minimum cost of 50c. per cu. ft. an investment of $250,000,000 is indicated.

It is impossible to tell how much duplication may be included in these two figures, but it is safe to assume a total investment of $350,000,000 in freezing and storage equipment. At 5 percent on the investment, this is equivalent to an annual hidden cost of $17,500,000 to the industry. At ¼c. per pound for freezing and an average of ¾c. per pound for storage refrigeration, it costs at least $10,000,000 annually for refrigeration.

The retail investment in 100,000 retail store cabinets, at $600 each—of $60,000,000 at 5 percent—equals an additional annual investment cost, exclusive of operating cost, of $3,000,000. One cent per pound is a fair average cost of icing-in-transit, especially if no account is taken of the additional costs occasioned by re-shipping from warehouse to warehouse several times. Thus, based on 1,000,000,000 lb., refrigeration during transportation adds another $10,000,000 annually to the refrigeration charge without even including the investment cost of thousands of refrigeration-type railroad cars and trucks, nor the need for express rates instead of freight and water rates.

This makes a total minimum cost of $40,500,000 annually for refrigeration. Since $2,500,000 of this is caused by the freezing process itself, $38,000,000 is caused by the refrigeration used in distribution. This is equivalent to 3c. per lb. in excess of the cost of distributing canned goods. Moreover, it is an inherent cost that cannot be avoided. If any part of this 3c. differential is subjected to markups by retailers or wholesalers or is used as the basis of brokerage fees, the differential becomes greater than 3c. Since this actually occurs in practice, the differential over canned goods is usually much greater than 3c. per lb. in the final price the consumer pays.

Carlton* pointed out that the costs of producing canned or frozen vegetables are quite similar. In fact, using 1937 figures, he cites the cost as 10c. per lb. net for the canned and 8.37c. per lb. for the frozen including freezing and one month's storage. There is no reason to believe that the cost ratio between canned and frozen foods has changed much today. Therefore, it is quite evident that there is little opportunity to shave costs at the packer level, since these may already be somewhat lower than for the equivalent canned article. We must lower the cost of distribution if we are to reduce retail prices.

During the war, wholesalers were allowed a 24 to 27 percent markup by OPA. After June, 1946, however, the seller's market began to disappear. Today, wholesalers are being asked to take as low as a 10 percent markup in some lines. Many cannot break even at a 14 percent average markup, although competitive factors are gradually forcing them to this level. The more progressive are building their own warehouses to eliminate the profit portion of this service cost.

Of course, the wholesaler who does this may reduce his flexibility, increase his overhead, reduce his working capital, increase his use of short term loans, increase his headaches and shorten his life. But what else can he do? Anyone familiar with increased transportation costs will not expect any shrinkage in this area. Warehouses are not making a fortune out of frozen foods in spite of the high prices they must charge. All in all, therefore, every factor in the industry is in the squeeze of a high-cost vise.

Thus far, the industry has developed along normal paths previously followed by the canning industry, except to add higher costs because of the perishability of the product. It may also be concluded that retail prices cannot be placed high enough to absorb the refrigeration cost. Accordingly, as the public's purse strings become tighter, it is going to take considerable promotional pressure to continue the advance in retail sales volume begun about two years ago.

Three Fields Targeted

Excluding advertising from this discussion, there are three fields into which we should aim our microscope for a closer inspection, namely, *Merchandising, Distribution,* and *Marketing.*

To tamper with the status quo in such specialized fields, one must specialize in those fields. However, close study reveals several loopholes for improvement, which should be brought to the attention of the experts. It is hoped by so doing to create a research attitude that may develop certain practical innovations and enable the industry to obtain a more encouraging vista of the future than found today.

The market for frozen foods is practically the same as that for canned and fresh foods. The three industries are in direct competition in the great American market, which we are about

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* *The Frozen Food Industry,* by Harry Carlton, pp. 145-6, University of Tennessee Press, Knoxville, Tenn., 1941.

to discuss from the viewpoint of a distribution specialist. For convenience and simplicity, we have classified the markets along the two lines already followed by the industry—Institutional and Retail.

THE INSTITUTIONAL MARKET

Institutions buy for utility—not for appearance, style or even quality, all of which are secondary to price and unit size in which the product is presented. As to unit size, for instance, although institutions prefer to purchase in bulk, they can do so only if convenience for removing small portions is provided. An institution may purchase free-running peas, refusing to buy solid-pack peas while the others are available. The fact that the free-running peas save kitchen labor may more than offset the fact that because of lower density, this type of product costs more to produce, package, transport and warehouse. There may even be willingness to take lower quality to get the right price and type of product.

But in spite of this knowledge, no attempt has been made by the industry to pack such products as spinach (which does not lend itself to the free-running form) in unitized or compartmentized packages in which single serving units can be removed as desired. Thus, an improved merchandising approach might conceivably reduce serving costs sufficiently to justify a higher price for the product.

Although the institutional buyer thinks largely in terms of price, he has also developed certain standards and buying specifications. To this end he has continually hoped that the frozen food industry would set up standard grades. Despite continued pressure in this direction, packers have made no progress toward setting universal industry standards. Therefore, the buyer can use only whatever helps he himself may devise in conjunction with the inspection services provided by state and federal marketing authorities.

The latter have set up grades and "tentative" standards for measuring the quality of frozen foods as a basis of understanding between buyer and seller. For the most part, the nomenclature of such standards is closely related to that of the canning industry. However, in practice the system does not work as well as it now does in the canning industry, where standard practices have been accepted by all packers under the leadership of the National Canners Association. The canners also receive technical services of great value from the large can manufacturers.

On the other hand, the frozen food industry is composed of many individualists working without help from outside sources. As a result, products are non-uniform and grade inspections fail to agree, so that sellers often have to resort to court to settle differences of opinion with buyers. Actually, although the grading on both ends is usually done honestly and in good faith, the whole trouble is caused by non-uniformity of the raw product and the non-representativeness of a moderate sample, both of which can be blamed on the lack of easily observed standards. The only point to mentioning this lack of standards is because it increases distribution costs and results in still lower profits.

Grading Service Available

The Production & Marketing Administration, U. S. Department of Agriculture, has provided a service to packers whereunder continuous inspection, grading and segregation of incoming product is provided at a reasonable cost. The packer then has the privilege of labeling his product with the emblem of the inspection service. Surprisingly, only a small number of frozen food packers make use of the service.

Some packers at one time indicated the grade on the label, but this usually relegates a large part of the pack automatically to a lower price class. Therefore, instead of labeling it Grade B, the lower quality is placed on the market under different labels so that it may pass as higher class merchandise than it really is while the advertised brand can be kept at a high quality level.

It is this sort of practice that confuses even the wary buyer and causes so many costly disputes between buyer and seller.

As a result of such difficulties, packers often find it more convenient to admit of only one grade by culling out only enough of the lower quality material to raise the general quality level. Thus, in packing a product containing 45 percent Grade A, 50 percent Grade B and 5 percent Grade C, only the very poorest quality material might be removed, and the product packed under an advertised label would be sold as top quality merchandise even though it could not be graded higher than B. The next day's pack may rate Grade A, but it would be packed under the same label by many packers.

Though fraught with uncertainty, with close supervision of growers and excellent coordination of growing and packing operations, some large canners and frozen food packers have been able to produce relatively high quality on the one-grade basis successfully. Their secret, of course, is to regulate below-grade materials to unlabeled cans or packages, often sold below cost to institutions to avoid the problem of competing in consumer markets with their own top quality merchandise. Products packed under this system may vary tremendously in quality from day to day because it would be uneconomical to cull too closely.

By shipping only one quality into any given market, some packers are able to avoid consumer criticism for variability of quality. However, once the merchandise gets exchanged from warehouse to warehouse because of ultimate shortages and overages here and there, the original objective may be entirely defeated. Products of variable quality packed under the identical label may then appear in one market quite unknown to the packer. Even if he succeeds in maintaining uniform quality in any one market, his poorer quality merchandise in other markets is at a disadvantage with the better quality packs of other brands.

To institutional buyers, spotty quality anathematizes any brand. They have ways of absorbing low quality when they know about it, but too often it accidentally shows up at an expensive banquet where a fancy product is demanded. As a result, the trade has learned to expect uncertain results from using frozen foods and many of the best restaurants serve only fresh foods on occasions where high quality is demanded. Thus, although the institutional buyer is sympathetic toward frozen foods because of obvious advantages, the industry has not made the consistent use of frozen foods easy for him on all occasions.

Requires Smart Merchandising

Some packers place their off-quality products in institutional bulk-containers, reserving their top quality for retail, and selling the institutional pack at a lower price based on lower quality. Moreover, the poorest product may be placed in unlabeled bulk containers in order to upgrade the labeled institutional pack. Although this results in three grades, it is a

What It Will Take

"Perhaps the whole structure of frozen food distribution should be changed. But first the industry must—

- **Set up standards**
- **Establish codes**
- **Promote itself through industry-wide advertising**
- **Provide an emblem of uniformity and gain its acceptance by the consumer**
- **Build up cooperative distribution practices"**

safer practice, since there is always a market even for "junk" at a price.

On some days, due to ultra-peak loads that cannot be handled by the retail packages, the day's pack is put up in institutional size packages. Under such conditions much of the product may be of excellent quality, far superior to the run-of-the-pack institutional merchandise. This product is usually not allowed to get "lost" in trade channels to avoid dissatisfaction with the regular institutional product, but most of all because this is an opportunity to obtain a premium for extra-high quality.

Thus, whether to pack institutional products under the same label as retail, whether to pack two different labels for retail and institutional, or whether to pack institutional as a whole or in part in unlabeled cartons requires smart merchandising and intelligent sales follow-through according to a strict marketing plan. Otherwise one's own products may be found competing with each other in the same market.

Aid to Distributors

To encourage and assist financially a worthy distributor, a large packer may find it expedient to keep a complete inventory of products in a local warehouse as a convenience to the wholesaler under a 10- to 30-day payment arrangement dated from the time of taking actual possession of the merchandise. Because this is a wedge with which to enter a territory, some national distributors and large packers are beginning to provide this service to wholesalers in many markets.

This is one method of helping the wholesaler achieve a profit in spite of his low markup through faster turnover and elimination of his inventory investment. However, it places a burden on the packer that can only result in the survival of the well-financed packers who can afford to tie up so much capital in inventory. This manner of controlling the market might quickly eliminate the small packer as a prime producer and narrow the field to a relatively few national brands.

Smaller packers in every industry take advantage of the lack of flexibility of the large packers by providing direct sale services at lower prices than might be obtained for the same product through wholesalers. To some extent this practice can be expanded into a fairly large volume through the cooperation of brokers and specialty suppliers. However, it is usually the method of the small high-cost specialty operator or of the small packer who is satisfied to stay small. The small packer would do nothing to antagonize the goodwill of wholesalers who might be able to help him later.

Institutional Buyers Look to Price, Convenience . . .

BULK QUANTITIES are preferred by institutional trade, but the packages must be in sizes that can be conveniently handled.

The direct sales method may be an economic necessity for the small packer whose market may be limited by raw material scarcity or who is packing a luxury product which might be uneconomical to market through wholesale distributors. One packer of this type licenses other packers in non-competing areas and by supplying partially processed raw material for re-processing, he is satisfied to make a small profit on a larger volume than he might otherwise be able to develop.

Institutional Control of Market

It is quite apparent that regardless of whether the product is obtained direct or through the broker-wholesaler route, institutional buyers control prices because they are price minded and are not too strict on quality requirements. Moreover, they not only can plan their buying many months in advance, but they can also get various packers and distributors bidding for their business. Most institutions are located in or near large terminal markets, where warehousing is plentiful and where they can exert sufficient competitive pressure to be assured of adequate supplies on a "hand-to-mouth" buying policy.

Unfortunately, the unstable condition of the industry is such that institutional buyers may not have allegience to any one brand, and as a result the institutional market becomes a hot-bed of competitive price-cutting and profitless operations for packer and distributor alike. This condition can hardly be rectified until the institutional trade can be certain that the product lives up to the grade on which it is purchased.

This fact may be the key to a tremendous expansion in the institutional trade as soon as the industry adopts grades and standards as a general policy, sets up the necessary educational facilities at plant level to guarantee the success of the policy, and proves to the institutional trade that it finally means what it has been saying.

National Distributor Operations

To further complicate the distribution picture, many packers round out their lines by having several products packed by others under a single label. Still other organizations may start out as distributors with all their products packed under a single label by others. In many cases, this practice precedes actual ownership. The chief exception to this is where some packers have learned to custom-pack one or two products so efficiently that retail prices of these items under distributor brands are competitive with packer brands because of a wider price spread obtained through efficiency. However, this occurrence is indeed rare and the majority of distributor brands may soon be faced with the dilemma of owning their own resources or getting out of the business because of the inelastic price spread.

Large institutional buyers can purchase direct. Small buyers are therefore forced for competitive reasons to buy as cheaply as possible. The ceiling thus created may cause a distributor's brand to be unprofitable in the case of institutional lines if he must add the single service of warehousing the goods for customers. This distributor then presses the contract packer for lower costs even at the expense of less quality control and poorer products. Thus, ownership of the producing plants appears to be an economic necessity.

. . . But Quality Comes First in Retail Markets

RETAIL SALES offer the great opportunity for expansion in the frozen food industry, with outlets now only 20 percent covered.

One of the largest operators at one time owned only a couple of plants but packed under contract in 15 or more while using the owned plants as a profit yardstick. Year after year, a consistent 10 percent higher price spread for the products of the owned plants resulted in that company's major expansion into wholly owned production facilities.

Since this is by no means a small financial hurdle to negotiate, very few national distributors are in a position to do much about cutting their costs through complete ownership of resources. Hence, most large nationally advertised distributor brands are now in the intermediate stages of part ownership and part contract procurement. Excellent bargains in packing plants become available each year. Acquisition of such properties by well financed advertised-brand packers is continually strengthening the industry.

THE RETAIL MARKET

For convenience, the general functions in marketing frozen foods were described above in connection with the discussion of *Institutional Markets*. To avoid repetition, only the divergent factors will be discussed in describing the functions of the retail market.

It has already been seen that prices in the institutional trade are too competitive to encourage the packing of a straight institutional line of products. One large national food manufacturer serving bakeries, restaurants and institutions with bulk frozen eggs and fruits added an institutional line of frozen vegetables for restaurant and institution customers. It was soon found that these products entailed increased selling costs, since they were extremely competitive, produced negligible profit, and required individual attention. Therefore, a line of retail items was added to round out a complete frozen food operation. This meant developing production facilities, called for a special quality control crew, and required taking on a new type of distribution entirely foreign to the usual bulk frozen food operations of the company.

It soon became apparent that a frozen food operation in a national market could hardly be conducted as a side line of one's regular business. It meant tying up valuable capital resources in a business which could offer no better profit prospects than using the capital in regular operations.

Accordingly, that company quickly dropped its retail operations after a two-year flurry and has since discontinued the merchandising of frozen vegetables even to its own restaurant and institutional customers. The company realized, in time to get out without too great financial loss, that frozen foods distribution must be "big business" to be successful. This is becoming more apparent every day.

Market Expansion

The great opportunity for expansion lies in the retail trade. Outlets are estimated to be only 20 percent saturated, compared with perhaps 75 percent saturation in the institutional field. These figures apply only to number of outlets, not to volume saturation, which is undoubtedly less than 50 percent. At today's prices, foods sold in the frozen state are valued at somewhat in excess of $350,000,000. This compares with total sales of the same commodities (regardless of whether fresh or processed) amounting to more than $10,000,000,000.

Thus, it can be seen that frozen foods have reached only 5 percent of their maximum potential of some $7,500,000,000. If the major part of this expansion is to be in the retail field, it is obvious that the retail store of the future will be a type of operation far different from that of the past.

Self-service packaged meats eventually will be centrally fabricated by large packers to meet the demand for pre-packaged merchandise indicated by the recent almost fabulous growth of self-service retail operations. The next imperative step is to freeze these products to extend their shelf life while on display. Thence, almost automatically, the frozen food business will mushroom, because once a retailer is committed to packaged produce in a major way, fresh fruits and vegetables become the only difficult merchandising problem. The avenue of least resistance then will be for retailers to go over completely to frozen foods except for non-conformable tomatoes, lettuce, celery, and the like.

The investment in equipment to attain this goal completely will be in the billions, so it will necessarily come slowly. Nevertheless, the outlook for expansion retailwise is indeed stupendous. First, we must see if the industry is yet ready for such a major expansion.

Retailer's Point of View

Price is only an indirect consideration of the retailer. If there is public demand for a product, he can add on his regular markup and, by varying the latter, increase his volume at will to find the critical profit point—point of diminishing returns. But frozen foods are to him a service like the few imported canned foods he stocks to attract a certain type of trade to his store.

In recent months, the retailer has been asked to take a smaller markup in keeping with the falling general price index of commodities, because frozen foods, as an industry, have no cushion in the price spread, each factor having to "tighten-the-belt" under such circumstances. And the retailer has been willing to cooperate where the reduction in the price results in increased demand or when the demand is increased by distributor advertising of one's brands.

Since the retailer is the key figure in the frozen food business, the industry up until now has rightfully been more concerned about consolidating its retailer franchise than in creating a consumer franchise. However, this policy has finally arrived at stalemate. To add new retailers and increase the per-store sales of frozen foods, the time has arrived for a sustained, all-industry advertising

campaign on a national scale. Once this gets under way, retailer cooperation is assured.

Retailer Enthusiasm

Not all retailers are phlegmatic about frozen foods. Indeed, there is a growing class of retailers including some chain store groups, who are great boosters. Gradually they are weeding out their own sales resistance practices, such as allowing merchandise to become "lost" in the bottom of the cabinet until it spoils or displaying frozen foods on the top of a table or showcase without the protection of refrigeration. They try to prolong their shelf life by getting the products into the frozen food cabinet soon after delivery to avoid softening. In fact, they are not only ready and willing to do many extra jobs especially needed by frozen foods, but they are also actually creating new handling and display improvements to increase customer recognition and expand the use of frozen foods.

Retailers buy for appearance, size and shape of the package because such characteristics provide the eye-appeal that creates purchases by casual customers. Most retailers are less concerned over loose or solid packs or convenience in use than they are with quality. They judge the quality by the complaints. If complaints occur repeatedly, they might change brands, usually selecting one that is nationally advertised even if the price is a little higher.

So the packer cannot for long take advantage of the retailer's technical ignorance, since the consumer must be satisfied or there will be no repeat sales. Unlike the institutional buyer, Mrs. Consumer merely buys elsewhere or not at all.

Theoretically, retail buyers should be interested in savings through institutional-size units at lower cost. Yet even with free-running products such as peas, there is relatively little interest. In fact, the trend even may be toward the more expensive smaller package. The demand, from couples and single persons living in apartments, for a single-portion package has been given much consideration. Since many such small units can be packed in the ice-cube compartment of a small refrigerator, such customers would use frozen foods to better advantage than fresh foods, and their volume of purchases would increase tremendously.

For instance, if cans of a 6 oz. unit were sold in a carrier, as are soft drinks, the customer could pick her own assortment at a reduced price for any six items. The units could be designed to fit into the standard ice cube compartment without having to remove the cans from the unit.

The matter of price is less important in the retail trade insofar as differentials between brands is concerned. At least one large packer has attempted to merchandise his unadvertised products by underselling the best nationally advertised brands. Unfortunately for such a plan, the public has come to look with suspicion on unadvertised brands that retail at somewhat lower prices than the recognized, nationally advertised products.

Numerous surveys in widely separated markets substantiate the statement that unknown brands cannot compete with nationally advertised brands. This is further borne out by the fact that during the 1946-47 market debacle, one large quality packer had to continue to ration retailers while unknown brands went begging for buyers at 30c. on the dollar.

This does not mean that national advertisers can expect the public to continue to pay high prices. With the lowering of prices of fresh and canned competitive items, the price of the frozen must also come down. In spite of continued high costs of labor, transportation and warehousing, the overall price spread has to shrink. To this end the retailer might reduce his markup of 25 to 30 percent to 20 to 24 percent, the wholesaler from 20-24 percent to 14-18 percent, and the packer might take up slack to keep products moving at a normal pace.

Nor does it mean that consumers are entirely happy over fluctuating quality as they become day-by-day users of nationally advertised brands. Even the best brands appear to pack only a sufficiently more uniform product than the competition to hold their advantage. Only a coordinated and cooperative effort to improve quality and advertise frozen foods by the newer factors in the field is necessary to close this gap of advantage. The best method of attack would appear to be a major united advertising campaign for frozen foods in general, while plugging only those brands that help to underwrite the expense.

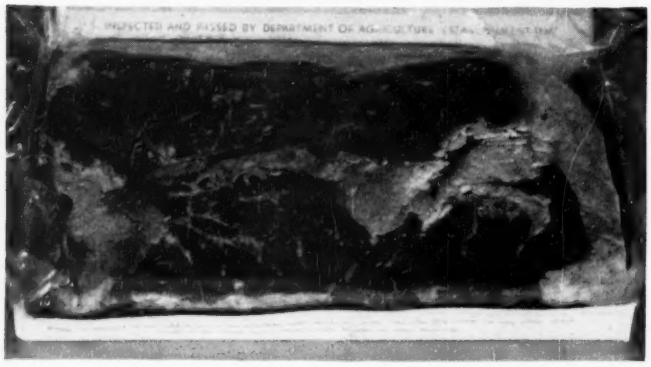
Pipe Lines to Retail Market

In retail marketing of frozen foods, the large packers depend almost entirely on the conventional wholesaler. Some brands have allowed exclusive franchise privileges to chain-store groups in certain areas where it is desired to enter the market with least effort or where the best wholesalers are previously committed to established brands. But chain-store organizations by and large have not found it expedient, as yet, to push frozen foods and as a result have not been in a favorable position to get between the wholesaler and packer on well-established brands.

Moreover, due to national advertising by the established brands, many chain stores have finally been forced to carry merchandise under the same conditions as local independent retail merchants. In the long run, however, the chains and supermarkets have a signal advantage in that whenever they are disposed to put selling pressure behind frozen foods, their volumes make it attractive for even national brands to by-pass wholesalers.

In contrast to the institutional market, which has been a wide-open scramble, only a few large packers have controlled the retail market up to now. However, the sudden impact of several new, nationally advertised frozen food brands of competitive quality, which have appeared on the market during the past five years, has had a tempering influence. The wholesaler has in each case proved to be a very

Frozen Meats Can "Unlock the Door"



WHEN prepackaged frozen meats come to pull their weight in the retail picture, sales of all frozen foods will move into full potential.

important factor. Therefore, the time is still far distant when the conventional wholesaler will serve the industry in a major capacity. He will always be necessary for serving the independent stores and smaller supermarkets, which will always far outnumber the direct-buying supermarkets.

Nevertheless, the large interests are definitely taking control of the market, and the pressure for a narrower price-spread has never been more apparent.

Fully integrated packers, having a larger margin of profit, have reduced retail prices so that distributor brands packed under contract are thus burdened with ceiling prices that lower their margin of profit. Unless they can figure ways and means of operating at lower cost, they must seek more economical methods of distribution, such as by direct selling. Or they, too, must become fully integrated operators.

Due to the lower prices thus forced on the industry, the retail volume of frozen foods has climbed steadily in the past two years. This growth has provided certain volume economies that have helped the distributor as well as the packer brands. However, the first real business recession that shrinks the retail volume may have dire effects on the economy of brands that do not have ownership roots deep in the packing industry.

COST FACTORS

By distribution expense is meant every cost accumulated from the time a product leaves the manufacturer. Thus, not only transportation and warehousing must be included in the retail price, but also the costs and profits of brokers, wholesalers and retailers, which are all costs of distribution. Previously we have seen that there are certain basic costs, such as investment in refrigeration facilities. Moreover, we have reviewed the cost limitations already placed on middlemen by the inflexible price spread between packer and consumer.

Although packers may reduce costs somewhat by more economical large-scale operations, this reduction can only be a minor one. Only through lowering distribution costs can a major saving be made that might place the frozen food industry in a more favorable competitive position, price-wise, with fresh and canned foods.

Frozen foods may be held in refrigerated storage at several different stages of their distribution. For instance, they may be stored at Hillsboro, Ore., several days before being stored in a public warehouse at Portland. After several months, they may then be sent to Cleveland for in-transit storage before being routed to Atlanta as a full carload. At Atlanta, the lot is broken up into truck lots during the following few months for storage at Macon, Columbus, Chattanooga, and other points, which may also be only temporary storage before shipping to smaller markets.

Warehousing and Handling Cut Into Consumers' Dollar

COST of warehousing and handling varies throughout country. It may exceed 10 percent of consumer's dollar—or 20 percent of retail price.

Packers try to avoid such a costly procedure by shipping direct to regional warehouses. However, public warehouses are not always well located with relation to markets. Such regional warehouses should be able to supply several large terminal markets as well as all the smaller markets of the region. Under today's conditions, the products are warehoused from three to six times, whereas by the regional warehouse method they need never be warehoused more than twice. They need only be shipped direct as packaged to regional warehouses and thence only to final markets.

Since the first month's storage is usually about 50 percent higher than that of subsequent months, the transfer from warehouse to warehouse is to be avoided where possible. Hence, the advantage of the regional warehouse. In addition, re-handling gets very costly if the products are moved several times. The handling charge is usually equal to about an ordinary month's storage. Warehousing and handling costs vary from city to city, but in general they may total as much as 3.0c. per pound or in excess of 10 percent of the consumer's dollar.

Thus, transportation and warehousing costs can amount to as much as 20 percent of the retail price. Were the wholesaler to absorb this complete cost, he would need to take a much higher markup than he can obtain.

This points out the careful management necessary to make a profit as a frozen food distributor. The fact that some wholesalers are able to operate at as low a markup as 15 percent indicates that they not only use good management but probably enjoy some transportation and warehousing allowances from the packer. If the latter is not financially able to lend actual financial assistance, packer-owned products may be made available in a local warehouse for the wholesaler to draw upon as needed. This reduces the latter's investment and provides a reasonable profit at low markup through increased number of turns of invested capital.

Few of the more than 700 prime packers are fully aware of the problem of wholesalers. National distributors, for instance, must find cheaper methods of distribution in order to compete successfully with large packers of nationally advertised brands, because of smaller operating margin.

Gets 6 Pointers

One national distributor considered breaking away from the normal channel by establishing his own branch wholesale distributing system in several test markets. The advantages did not justify expansion of the scheme originally outlined, but a first hand realization of the wholesaler's problem resulted. In announcing the abandonment of the experiment*, the president of the company pointed out the following opportunities for cutting costs, which his organization was putting into practice:

1. Costs are lowered through a

* See p. 94, Feb. 1950, FI.

Controls From Packer to Retailer

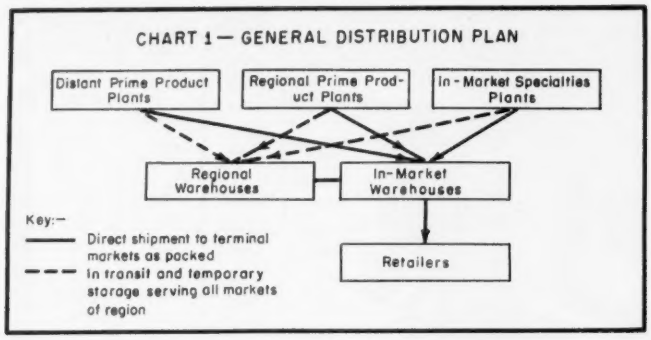


CHART 1 — GENERAL DISTRIBUTION PLAN
Distant Prime Product Plants
Regional Prime Product Plants
In-Market Specialties Plants
Regional Warehouses
In-Market Warehouses
Retailers
Key:—
Direct shipment to terminal markets as packed
In transit and temporary storage serving all markets of region

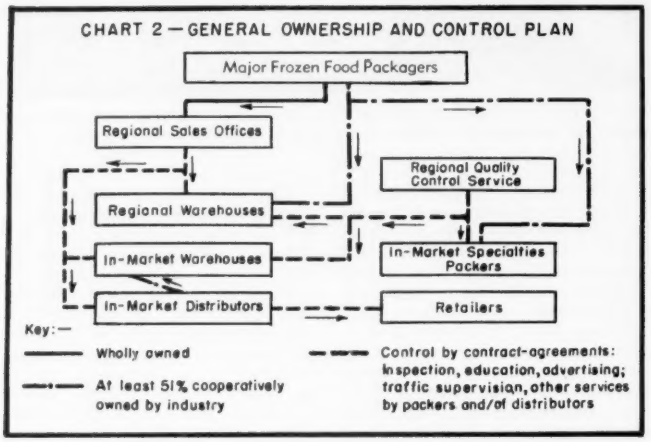


CHART 2 — GENERAL OWNERSHIP AND CONTROL PLAN
Major Frozen Food Packagers
Regional Sales Offices
Regional Quality Control Service
Regional Warehouses
In-Market Warehouses
In-Market Specialties Packers
In-Market Distributors
Retailers
Key:—
Wholly owned
At least 51% cooperatively owned by industry
Control by contract-agreements: inspection, education, advertising; traffic supervision, other services by packers and/or distributors

policy of straight case sales, eliminating necessity for break-up rooms for filling orders. One man does the work of four now required in selling broken lots.

2. Wholesaler eliminates personal supervision by setting up local public warehouses to fill and case-mark retail orders (costs about 1c. per dozen packages).

3. By installing two price lists, those able to buy F.O.B. warehouse save 7 percent of store-door delivered prices, thus maintaining wholesalers in a strong competitive position.

4. The company now plans to stock a full line of items in key warehouses near the wholesaler's place of business to give the latter an opportunity for higher profit through greater turnover.

5. It now packs all fruit and vegetable items one-dozen to the case to reduce warehouse's cost of assembling orders.

6. The company realizes it must do everything in its power to assure the wholesale distributor a reasonable profit.

That company has full realization of the serious plight that some of its distributors may get into if abandoned. There are problems that cannot be solved without packer's cooperation. The lead it has taken in cooperating closely with its wholesale distributors is a noteworthy step in the right direction. Other national distributors may follow suit and create still more important cost-cutting innovations in distributing frozen foods.

FROM HERE ON—

Thus far, we have come to realize that no single factor in the frozen food industry enjoys a substantial profit margin due to high basic cost. Farmer, packer, broker, wholesaler and retailer all complain of high costs and low profits. Current warehousing, transportation and labor costs are not only high now but are almost sure to be higher in the future. It has already been shown that at least one method (that of breaking cases) which has grown up in the industry can be streamlined to provide lower costs. Therefore, the industry must scrutinize each and every item that can possibly lower the cost of distribution. Indeed, ordinary savings will not reduce the differential of 3c. per pound between canned and frozen products caused by the refrigeration burden.

Accordingly, one should look for some revolutionary method of changing the structure of the industry itself —an approach the canning industry has never been forced to consider. The frozen food industry grew along standard lines of distribution previously developed for less perishable packaged foods. Milk, on the other hand, is so perishable that it needs a special method of distribution required for no other major food product. In spite of the fact that constant research has cut costs to absolute essentials, the expense of distributing milk remains high.

Intermediate Approach Weighed

Perhaps, some intermediate type of distribution between that of frozen foods and modern milk technics might be developed. In the following, a start in this direction is proposed.

We have already seen how quickly the demand for frozen foods might be increased as a direct result of rapid expansion of self-service meats. The ultimate realization of this potential presents an unusual situation, which is the basis upon which the more thoughtful leaders are already planning expansion programs.

On the other hand, the industry is not prepared as yet to move into higher ground because it is not yet organized as an industry. It must first eliminate weaknesses and build a more solid foundation. The following five point program, frankly, is not intended for the man on the firing line, but rather for the leaders of finance and industry who are today worried about the lack of profit in frozen foods:

1. Instead of waiting for a business recession to eliminate high-cost, low quality, marginal operators, a more direct method would be to set up industry standards that all packers must meet or otherwise find great difficulty in marketing their products. This may require the leadership of an industry-supported, self-policing, educational and advisory group possibly patterned after the National Canners Association.

2. A concerted effort might be made to set up industry codes, using whatever objective guides are available, supplemented by adequate subjective guides acceptable to the more realistic industry leaders. Simultaneously, research to develop more suitable objective standards should be instituted by the industry and by state and federal research laboratories.

3. Once majority acceptance of codes and standards is assured, an industry-wide advertising campaign can be launched with full knowledge

that gains in volume will be permanent from the quality standpoint at least.

4. Non-conforming prime packers may be "black-balled" by providing an emblem of conformity and advertising the importance to the consumer of its appearance on each package.

The requirements cited thus far automatically retire weak operators from business. The remaining operators will be technically strong. With full confidence at last of bankers, the industry can then undertake to develop major economies in distributing its products.

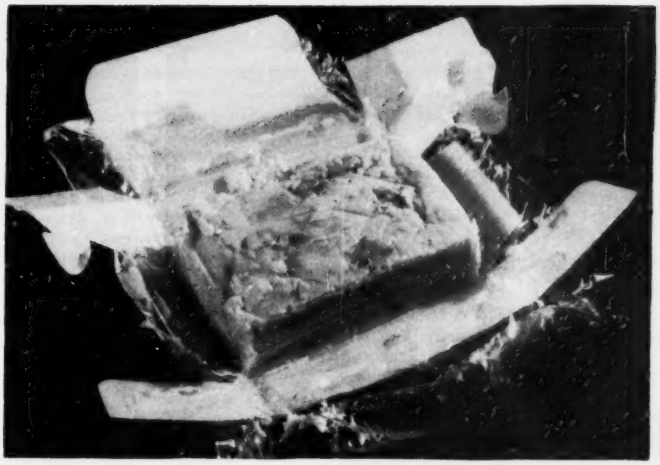
5. Once a cost-reducing distribution plan has been decided upon, only then can the industry as a unit begin to plan the facilities to meet the challenge and responsibilities of double, treble and even greater volumes of business without fear that opportunists will again destroy public goodwill as they did during and shortly after World War II. As of this moment, each company is faced with the major issue of reorganizing operations to assure its products a competitive role in the perishable food industry. The 3c. differential between frozen and canned foods might be reduced eventually through such individual, internal reorganizations. However, it can never be eliminated without industry-wide cooperation.

It is later than you may realize. The time is running out when the industry can present a united front for meeting the challenge of greater volume being developed through normal evolution of supermarket, self-service operations. It will not be long before individual operators may find themselves at the mercy of the large retailers, unless a united industry front is presented. In fact, the entire industry could eventually become merely an adjunct of central retail buying organizations. With lower prices to consumers apparently more important in Congress than enforcement of anti-monopoly legislation, such a possibility is more real than apparent. This should be a telling reason for organizing substantial, industry-wide, coordinated efforts to promulgate advances along lines described in Points 1 to 5 above.

Coordinated Store-Door Delivery

Usually, the reader of a survey report cannot be expected to see the way out of a dilemma, which may be pointed out by the author, unless he is given sufficient additional material in the form of suggested methods of attack or even a sketchy program that may stimulate his brain cells to active productive thinking on the subject. To this end a few suggestions are ventured.

"Cooked Frozen Foods Need Not Have Failed"



HIGH DISTRIBUTION COSTS crimped cooked frozen foods, but production in local areas will revive them. Pictured here: Chicken a la king.

Merchants Parcel Service, of Syracuse, will deliver a package of reasonable size in its city delivery zone of a 10-mile radius for less than 20c. per parcel up to 75 lb. in weight. This company exists through profit so that the average cost of such a delivery must be less than 20c. per stop. The ordinary frozen food truck delivers only 25 to 40 orders a day because it travels at least twice as far as the parcel delivery truck, which regularly makes 150 to 160 stops daily.

Toward Concentration

This particular service is mentioned because it frequently delivers frozen foods, which have to be placed in the home freezers of the Dey Bros. customers. The manager estimates that his trucks could give this type of service and still deliver a minimum of 75 orders daily. The reason a frozen food distributor's truck is limited to half the number of stops is because the stops are so few and far between. As a result, the cost per stop is more than twice what it could be due to this one fact alone. Each city has similar delivery services and the majority of them may be willing to add frozen delivery within the normal delivery area if concentration of deliveries for all brands could be developed.

A large ice-cream company having a fleet of nearly 1,000 trucks has a delivery cost varying from 10 to 41c. with an average of 24c. per gallon. Since the ice cream industry has educated the retailer to expect special services from route salesmen, which may even include washing dirty counters, dishes and the like, it is afraid to make any radical change that might lose business to a competitor even though a saving of 10 to 15c. per gallon were possible. The advertising value of such a large fleet of trucks is certainly not worth 10c. a gallon and would be worth nothing if the whole industry adopted the parcel service system and passed on the resulting savings to the consumer.

The frozen food industry may give retailers a certain amount of service, such as arranging products in the case, but fortunately they have not yet become as involved in such services as the ice cream industry. They cannot afford to compete in this regard with an industry where the normal markup may be 35 to 40 percent.

Gage Worth of Painted Name

We visited one frozen food distributor, operating seven trucks, who was about to renew contracts with his drivers, who had requested salary increases. At that moment, he would gladly have transferred this problem to a parcel service if other distributors would do likewise. Although his name on seven trucks had some advertising value, it was not worth half his delivery cost. In fact, if half his delivery cost would be saved, the difference would enable him to concentrate his advertising where it is needed most.

Careful analysis shows that a seven-truck delivery operation, which extends over a wide area for the delivery of a single brand of frozen foods,

is uneconomical because even the closest city stops are much too far apart. If four brands can be handled by the same truck, oftentimes they can be delivered at one stop at no more than one-third greater cost than for one brand. If the cost per stop is 50c. for one brand, it is 67c. for four brands, or 17c. per brand.

This may not happen as a rule, but it explains why a cooperative effort among distributors in a large city might cut delivery costs as much as half.

Cooperative Warehousing at Terminals

The Watertown, Mass., warehouse of the Quincy Market & Cold Storage Co. provides exceptionally fine services for the frozen food industry in the Boston area. Several distributors have breakup rooms at this location, and as a result the warehouse is a beehive of parallel efforts. It is easy to visualize the economy that would ensue if all products were cartoned one-dozen to the case, if a minimum of one dozen packages (1 case) per item were standard practice, and if the warehouse performed the service of case-marking and assembling the orders. Compared with the cost of operating several breakup rooms, the saving is obvious.

One large terminal market distributor recently studied the possibilities of building his own 23-car cold storage warehouse to avoid the high cost of warehousing in his area. It is a question whether tying up the amount of working capital that this entails is a good investment. On the other hand, if several distributors should combine in such a venture, then financing, service and supervision costs would be minimized and the chances for savings would be greatly enhanced.

Warehousing-and-Delivery Service

Since it is apparently possible to save costs in terminal markets in both store-door delivery and warehousing of frozen foods, it should also be possible to produce even greater savings by combining both operations under the direction of a single executive as a complete warehousing-delivery service for all frozen food distributors in any given market. Initially, this could be done out of a standard warehouse until expansion of the service justified distributor-owned facilities.

Combined costs for these services are now estimated to range between 2.0 and 4.5c. per pound, depending on cost of breakup room operations, dealer service, dry ice used, re-handling in warehouse, and numerous other incidentals over and above basic warehousing and trucking costs. It is estimated that streamlined services would reduce costs by at least 50 percent in any combined operation handled on a cooperative basis.

A Regional Distribution Plan

The plan illustrated in charts 1 and 2 visualizes a frozen food industry composed of about a dozen major brands, each having taproots deep in the production of major perishable foods, including fruits, vegetables, meats, poultry and fish. This is true of some brands already. However, these uncooked frozen products must some day be supplemented by semi-prepared products to bring greater convenience and ease of living into American homes than is possible through the frozen prime products alone. One can visualize several hundred frozen food items in the future, compared with the several dozen standard prime items of today.

Several retailer members of the Frozen Food Foundation have developed resources for over 200 items to fit the demands of their home delivery customers. One of these stores will probably gross in excess of $500,000 of frozen food sales in 1950, with as much as 60 percent of the merchandise originating in the store's own restaurant division. This experience reveals the latent possibilities of the industry, which are seldom recognized by the fruit and vegetable packers, who now comprise what many think of as the frozen food industry of today.

The first few large ventures in distributing frozen cooked foods on a national scale failed because of distributon costs—not because of the original cost nor of the quality of the products. If one can visualize these prepared and semi-prepared products being manufactured in the markets where they will be consumed—the cost of distribution thereby being held to a minimum—the volume of sales could by far surpass those of any other frozen food item. This in-market production could become the nucleus of the frozen food industry, because frozen prepared foods could well exceed 50 percent of the industry sales.

For the person who can appreciate that all products in the market area can be warehoused and delivered as a coordinated industry service, it is not difficult to imagine appropriately large, strategically located regional distribution centers furnishing all the markets of the country to which all products not shipped direct are shipped for in-transit or temporary storage. (Let us hope that the railroads and trucking companies may gladly underwrite the cost of building or converting these storages for the purpose of streamlining the handling of frozen foods.)

Let us further imagine that, through coordinated effort, the service functions at these regional accumulating centers can be performed on a non-profit basis. Let us then provide a coordinated non-profit trucking service out of these regional centers to area markets. Finally, let us hope that in-market distributors can obtain practically all supplies not manufactured within *their own* region direct from packers or from said regional warehouses.

When this plan is reduced to its barest essentials, it is seen that warehousing, other than on packer's premises, can be accomplished in a maximum of two stages, both of which can be serviced at a minimum expense through coordinated efforts within the industry.

One can assume that further reduction of distribution costs might ensue if national traffic direction can also be accomplished on a coordinated basis. This could streamline products direct from factories to regional warehouses in a well-regulated flow that will avoid shortages and overages, re-shipping and extra handling charges, which now eat into the profits of the business. However, it is not the purpose of this paper to narrow one's thinking into any particular groove. Such a plan can have many ramifications.

Clearing House of Experiences

The reader must now return from this remote excursion into Utopia where individual members of the industry are pictured as part of a well-organized brotherhood. Unfortunately, the industry at present contains nearly 1,000 different companies of all sizes, packing products without industry-wide codes and standards. Much consolidation and reorganization will probably be necessary before any overall concerted effort is possible. In the meantime, it is hoped that it may be possible to use the pages of FOOD INDUSTRIES as a clearing house for ideas.

Industry Now at Crossroads

Several opportunities for new merchandising and distribution have been pointed out in the foregoing. Insofar as increasing volume and decreasing costs of handling are concerned, merchandising certainly could play an important role. However, merchandising is a pretty big subject in itself and therefore cannot be expanded in connection with a brief survey of distribution costs.

Before the frozen food industry can fully extract the potential profits that could lie ahead, it must break new ground in distribution, as it has done so well in production. In this respect, it has reached a crossroads. At this point, taking the wrong road might mean oblivion as an industry.

Modern, Sanitary Units Highlight the Line

THIS Votator chills margarine, then extrudes it to an unrefrigerated cylinder for further crystallization.

SANITARY BELT conveys 1-lb. molds of margarine to packaging units. Operator makes periodic weight checks.

New Margarine Plant Sets Quality Pace

Constant care marks making and mixing of oil and milk components. Latest units used. Sanitation stressed. Coupling the plant with refinery ups performance

E. DALTON WHITE
"Food Industries," Atlanta, Ga.

Purity and uniformity of the product are assured by top operating efficieny at the new Armour and Company margarine plant at Chattanooga, Tenn., one of the largest and most modern in the United States.

Just completed recently, the plant is now serving some 30 southern branch houses and sales departments. It has a weekly capacity of 250,000 lb. of Mayflower margarine on a one-shift basis. And provisions have already been made for expanded production to meet future needs.

■ **Operation of this plant in connection with Armour's Lookout Oil & Refining Co. assures specific advantages. Being located adjacent to the latter's vegetable oil refining and hydrogenating facilities, the margarine plant at all times has ready access to raw materials. Moreover, this single-area arrangement enables the most rigid quality control over all raw products and their processing.**

Design and layout of the plant provide for continuous flow of materials and automatic operations. The two-story and basement brick building is modern and sanitary throughout. Interior walls are finished in buff-colored glazed tile and the concrete ceilings are painted buff. Reinforced concrete floors are covered with non-skid red-colored split brick. Fluorescent lighting has been installed throughout the plant, and all milk and margarine processing rooms are air conditioned.

There is adequate storage accommodation for hydrogenated oil and other supplies. The large cold storage area provides sufficient space for the required chilling of packaged margarine before it is shipped.

To assure utmost sanitation, all pipes, pumps, tanks and other equipment coming in contact with milk are made of stainless steel. And even the weighing tank for hydrogenated oil (enclosed where the oil goes to the churn) is made of stainless steel.

As for the equipment used in the milk and margarine processing operations, every piece is disassembled and thoroughly cleansed and steam sterilized at the end of each day's operation. And the sterilization is repeated next morning before starting production.

Other details: Cooling requirements for processing are filled by a 110-ton capacity ammonia compressor, which also supplies air-conditioning for the plant. Quick communication between departments is furnished by an "intercom" system. Additional rail-and-truck receiving and shipping facilities have been provided at the plant.

Processing Steps Detailed

Crude vegetable oil, used in margarine production, is received at the plant in tank cars and is pumped di-

rect to tank-farm storage or to six 60,000 lb. in-plant intermediate-storage tanks. From the latter tanks, the oil is processed in a series of stages to produce a tasteless, odorless and water-white oil.

In the first stage of refining, the crude oil and alkali are fed continuously by a proportioning device to a mixer where the alkali combines with the free fatty acid and most other impurities in the oil. The mixture is raised to a temperature of about 140 deg. F. in a heat exchanger. It is then fed to a high speed, hollow-bowl type centrifuge, where the oil and soap stock are separated. Soapstock is piped to storage. The oil, still retaining a small amount of moisture, soapstock and free alkali, goes to the warm water washing tank.

As a means of removing these impurities not separated in the primary centrifuge unit, 10 to 15 percent warm water is added to the oil and thoroughly agitated in the washing tank. Low pressure steam coils in the tank raise the liquid up to 170 180 deg. F. before it is continuously pumped to a secondary centrifuge.

In this unit, the water (containing the soluble impurities) and the oil are separated. This washing removes any remaining trace of alkali and soapstock, hence the oil leaving the secondary centrifuge is clean and brilliant.

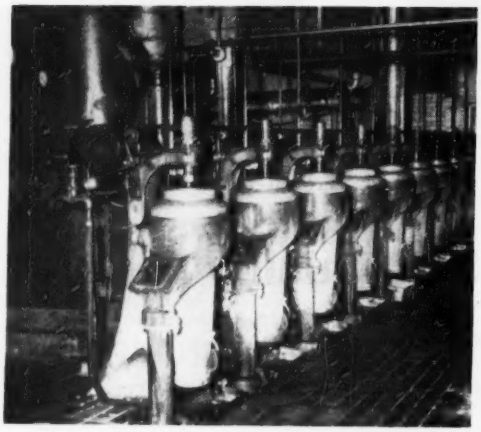
Since this oil still contains a small amount of moisture, it is vacuum dried to a maximum of 500th of 1 percent. Oil from the dryer is metered to outside plant storage—capacity 3,000,000 gal. of crude and refined vegetable oils. From this storage, the oil is thereafter processed into margarine, hydrogenated shortening, Kremit, Kremor, salad oil and cooking oils.

Clarity Accented

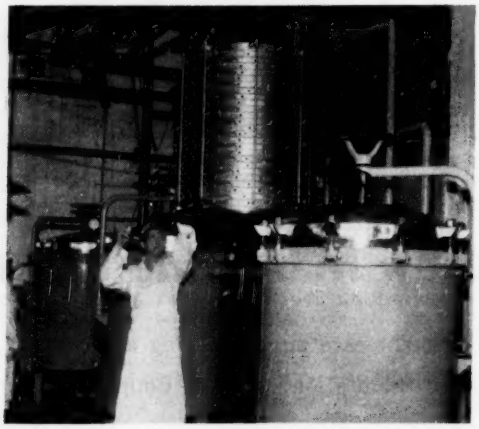
Because of varying state laws relating to the sale of colored margarine, great care is exercised to produce this oil water-clear. This is accomplished through a system of bleaching and filtering. The process removes coloring matter remaining in the refined oil.

In the bleaching process, the refined oil is pumped from the outside storage tanks to a large weighing tank. From this tank it is pumped to batch-type bleaching tanks, where activated earth, fullers' earth, or combinations of these, and carbon are added in small per-

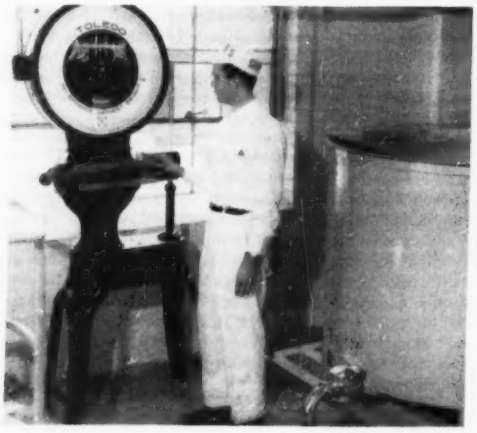
Primary Stations in Margarine Production



IN THESE centrifuges, oil and soapstock are separated. Soapstock goes to storage, oil to washing tanks.



THREE stainless steel horizontal-plate pressure filters polish oil to high clarity. Filter aid is used.



EXACT WEIGHT of oil going into margarine production is checked in scale tank by Ass't. Supt. R. I. Levan.

IN THIS pasteurizing tank, heat is supplied by these revolving coils. Watching is Supt. W. T. Watkins.

centages to the total batch. Medium speed agitation takes place for about 10 min. at a temperature of 220-225 deg. F.

This mixture of oil and bleaching material is pumped, under low pressure, through a plate-and-frame filter press, the bleaching agent being retained on the cloth in the press.

Under normal operations, the filters are thoroughly cleaned at the end of each shift, or more often if necessary. It may be noted that no satisfactory commercial outlet has been found for the bleaching agent waste, although it has been successfully used as a top binder for dirt areas subject to dusty conditions. However, during World War II and shortly thereafter when there was a scarcity of fats, the oil in filter waste was used in soap making.

Oil from the filters is pumped to the hydrogen plant, where a small percentage of finely divided nickel, suspended on diatomaceous earth, is used as a catalyst in the hydrogenation process. This process is carried out in steel tanks of 15,000 to 30,000 lb. capacity at temperatures ranging from 200 to 425 deg. F., under varying pressures. Hydrogen gas is caused to combine with the oil by chemical reaction. Mechanical agitation keeps the catalyst in suspension to speed hydrogenation.

Upon completion of the hydrogenation process, the catalyst is filtered out and in some instances re-used until practically inactive. It is then discarded.

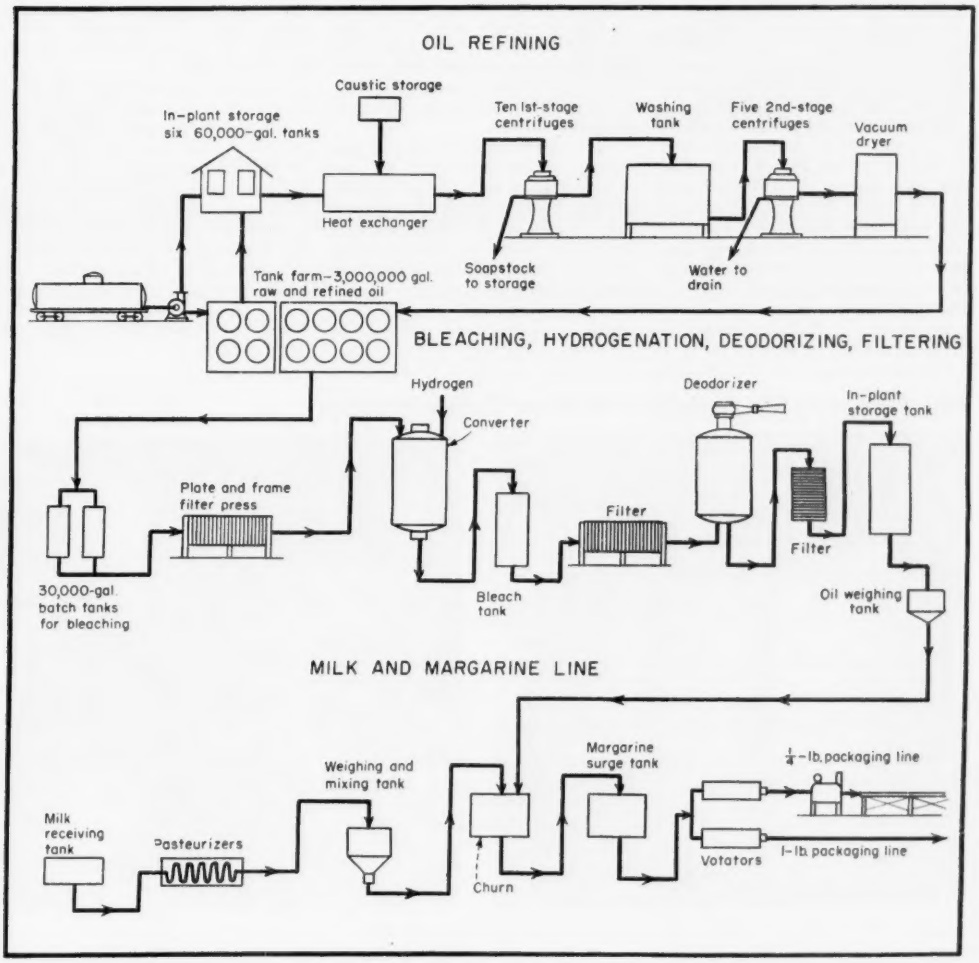
In the hydrogenation process the oil is changed from a liquid to a semi-solid and the melting point raised to the desired level. The product remains firm almost to the melting point of the oil, yet it melts quickly at body temperature.

The company has found that this hydrogenation process has advantages over the method of mixture of liquid and fully hydrogenated oil. It is carefully controlled to produce a tailor-made product for specific use.

All hydrogen used in the process is manufactured by the company in its own plant from propane gas. The hydrogen gas tests up to 99.95 percent pure.

In order to produce the water-clear oil, the hydrogenated product is then rebleached and filtered. It is now ready for processing through the deodorizers to make it odorless and tasteless.

And the Component Phases of the Process



Deodorizing is virtually high temperature distillation under very high vacuum. The process is operated continuously on a three-shift basis to insure a steady supply of oil for production of margarine and other products.

Bleached and filtered hydrogenated oil is pumped into 30,000-lb. capacity steel tanks. Steam is metered to a distributor in the bottom of the deodorizer, producing great agitation. The oil is maintained at a high temperature by a system of closed coils, while an absolute pressure of ¼ in. mercury is maintained by three stages of thermocompression.

After complete deodorization, the oil is cooled to 120 to 140 deg. F. by pumping through a water-to-oil heat exchanger.

The final process in the oil preparation is through horizontal plate filters, from which the margarine oil is piped to in-plant 30,000-lb. storage tanks.

Seven of these tanks, each equipped with propellor-type mixers, are fitted with coils for steam and cold water to maintain the oil in a liquid state a few degrees above the melting point.

Each day the oil in the tanks is checked for quality. A chemical analysis is made before the oil is used in producing margarine. This testing is another step in the rigid quality control maintained through the plant.

As a precaution against any possible contamination, each oil storage tank is thorough cleaned with hot water before being refilled with a new batch of oil.

The processing of milk in the production of margarine is under the most sanitary conditions. Pasteurized skim milk is received from the dairy in large cans at the plant. It is then tested for quality and weighed. The cans are sterilized before they are returned to the dairy.

Milk from the receiving plant is pumped through stainless steel equipment to 500-gal. capacity pasteurizers. There are a number of such tanks installed in an air-conditioned room. The milk is re-pasteurized and inoculated with a special laboratory-controlled culture to give the margarine taste and aroma. This culture ripens the milk and provides the margarine with about 16.5 percent pure buttermilk.

The basic mother culture is made under rigidly controlled conditions in the laboratory. It is then added to milk in 100-gal. capacity stainless steel tanks. This milk is then allowed to ripen to form the culture used in the pasteurizing tanks.

Culturing of the milk in the pasteurizing tanks is under constant observation, with periodic tests made. When the milk has ripened sufficiently, the process is checked by cooling to 40 deg. F. or less.

Processed milk remains in the pasteurizing tanks until ready for use. It is then piped to a 75-gal. capacity weighing tank equipped with a portable propeller-type mixer. Salt is then added and there is agitation until the salt is dissolved. The milk is then ready for mixing with the oil and other ingredients to produce margarine.

Oil from the storage tank is pumped first to the 3,000-lb. stainless steel weighing tank and then to 500-gal. capacity churns. Vitamins, emulsifier, anti-spattering agents, also coloring material (if colored margarine is to be made), are added and mixed at a temperature not to exceed 120 deg. F. The milk, containing salt, is then pumped into the churns. Here, the mixture is churned for a period not to exceed 30 min. and at a temperature a few degrees above the melting point.

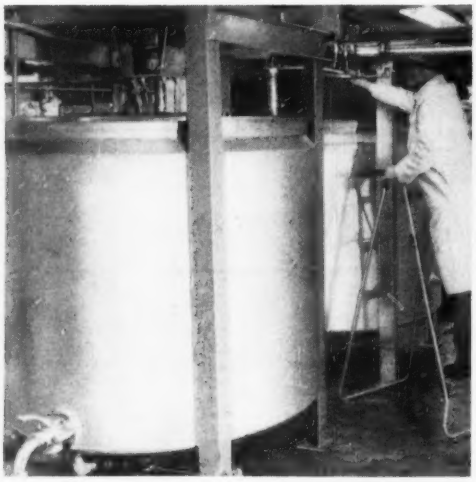
The resulting emulsion—composed of 80 percent oil, about 16.5 percent milk, 2.5 to 3 percent salt, not over ½ percent emulsifier, and 9,000 to 15,000 units of Vitamin A—is pumped to a holding tank. Liquid state is maintained by agitation and slight heating, if necessary.

Leaving tthe holding tank, the emulsion is pumped through a Votator, which continuously chills it then extrudes it into an unrefrigerated cylinder, where further crystallization takes place. The margarine then is forced into the print molder or briquette machine.

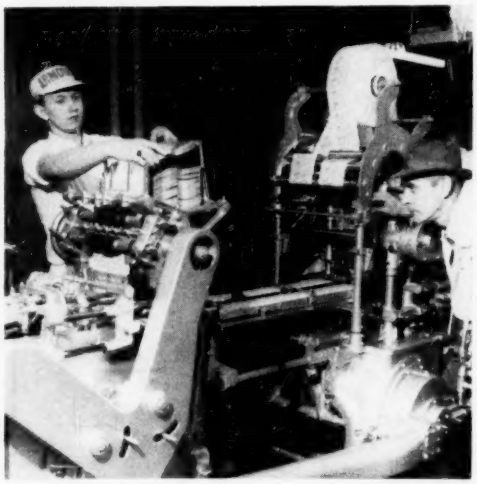
The plant has two margarine lines. One is for making ¼-lb. colored sticks, which are individually wrapped and placed in 1-lb. cartons. The other production line processes the regular 1-lb. packages. Both lines have automatic packaging.

Building of an efficient personnel has paralleled the advanced engineering of the plant. General manager of the new facility is R. E. Biggers, while C. L. Hunt is superintendent. The margarine plant's superintendent is W. T. Watkins.

Both Processing and Packaging Units are Closely Watched



HERE, action of one of stainless steel margarine churns is being checked by Gen. Supt. C. L. Hunt.



PRECISION adjustment of fast-rate automatic packaging machine is made by Master Mechanic J. E. Sanders (right).

↑Tedious, Drawn-Out Old Way

required continuous walking along table, unhandy pushing of supply boxes, repeated turning to rack for new stock

Quick, Efficient New Way→

spurts production by "reeling" varied stock right to packer's finger tips over convenient filling table. Tiresome walking and twisting are "out."

Ferris-Wheel Rack Licks Packing Peak

By constantly rotating stock within easy reach of worker, it ups output one-third and in half the space. Unit is suitable for a wide range of variety foods

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

"How can I get packing flexibility to meet periodic high demands for my product?" is a prime question asked by the variety-item food processor.

Recently, the need for a quick—and practical—answer to this problem became urgent at the Dutch Chocolate Shops, Columbus, Ohio. Special holiday demands for the company's 1-lb. variety-boxes of chocolates repeatedly got ahead of the supply, packing being the bottleneck. Hence, a simple, inexpensive method of speeding operations had to be devised.

The candymaker first made a careful study of its packing operations, then called in a local firm, Accurate Manufacturing Co. Directly, a unit to turn the trick took shape on paper, then became a reality in the shop—a compact, rotating stock-box rack flanked on either side by packing shelves (right photo, above). Resembling a ferris-wheel, this reel device constantly turns supplies of the various chocolates within easy reach of the packers.

With the new low-cost speed-packing system underway, three major improvements were noted:

1. Box output immediately rose nearly 35 percent, some 70 boxes being turned out in the time formerly required for 50.

2. Floor space required for packing had been reduced about 50 percent, releasing plant area for other purposes.

3. With turning for stock boxes and "table walking" eliminated, the work had been simplified. Packers were happier and more efficient.

■ Nor are these advantages limited to the candymaker. For this packing unit may be advantageously adopted by any food processor who turns out variety items—cookies, nuts, assorted cheeses, spice combinations, cut-up poultry, or similar products.

Now for the details on the new packing unit:

It consists of six metal trays that are mounted between two 40-in. dia. disks made of plywood. The trays are 60 in. long and 13¾ in. wide, and each holds five stock boxes of chocolates. There are vertical ends on the trays, with holes that fit over pins in the two wheel disks to support the trays and to permit them to swing freely and thereby remain in a horizontal position as the disks turn. On each side of the wheel are wooden shelves upon which the two operators pack. Mounted on the frame supporting the reel, each shelf is 62 in. long and 9¾ in. wide and can hold eight 1-lb boxes.

The new unit occupies only 25 sq. ft. Its wheel is driven by a 1/20 hp. motor. Speed of the wheel is one full turn every 5 min. Disks, metal trays, and packing shelves can be readily removed for easy cleaning or for storage between pack runs.

Incidentally, a new model is being constructed with metal instead of plywood disks. And a master speed ranger is being incorporated so that the turning rate of the wheel can be quickly adjusted to any speed between 3½ and 5 min.

The company's future plans call for

installation of similar units in its six retail stores located throughout Columbus. These will be used in the back rooms to enable two of the four girls staffing the store to supplement production during heavy-volume periods.

By contrasting the packer's movements in the new and old procedures, the improvements become evident:

In packing the new way, an operator first lines up four empty 1-lb. boxes on her packing shelf. Then, as the stock wheel rotates, delivering a tray-load of five stock boxes of different varieties of chocolates directly in front of her, she begins to pack.

Taking a chocolate out of the first stock box with her right hand, she puts it in a paper cup held in her left hand and places the piece in the first empty candy box. These steps are then repeated until all of the four candy boxes hold one chocolate of this variety.

She now packs the next variety from the second stock box, then the third. She continues in this manner until all candy boxes hold a full complement of the different varieties carried on the first turning tray.

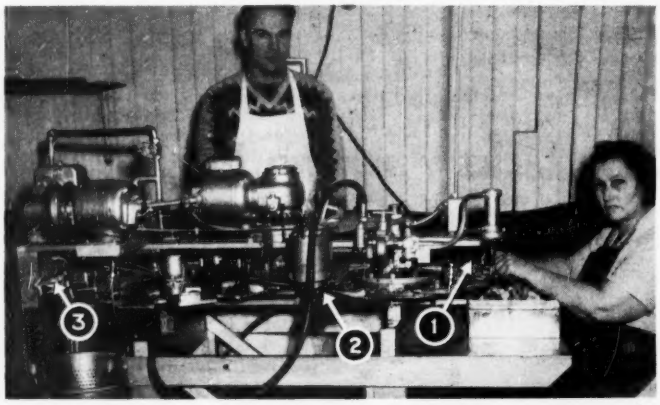
She is then ready for the next tray-load, which by this time has rotated into position in front of her. Packing is thus continued until all the candy boxes contain the 30 different varieties of chocolates.

Former Method Was Slow

In the old way, an operator arranged two rows of empties, 25 to a row, on a 3-ft. wide 15-ft. long wooden table. Facing this table was a wooden rack with shelves containing stock boxes of the chocolates.

In between worked the packer. She had to turn, after each full packing pass, to get a new stock box from the rack, and she had to work inconveniently over the larger stock box to feed the empties. She picked a chocolate out of the stock box with her right hand, placed it in a paper cup held in her left hand, and set the piece in its proper position in the candy box. This operation was continued until all 50 boxes held one chocolate of this variety. The operator had to walk the length of the table during her packing, sliding the stock box along as she worked.

Then she repeated the procedure with the other stock boxes, the full job entailing 30 turns to the rack for stock boxes and 30 walks along the table. It took about 100 min. for 50 boxes—an output now completed in hardly more than 70 min.



KEY PARTS of combination deveining and shelling unit are clamping station (1), deveining head (2), and shelling rolls (3).

Deveiner-Sheller Speeds Shrimp Job

Output seen three times greater than hand processing. All operations automatic, except feeding

FIRST MODEL of a shrimp deveining and shelling machine is being tested at the J. & L. Seafood Co., Cleveland. Made by Alpha Products Co. of that city, it is reported capable of handling 60 lb. of shrimp per hour, compared to the average 18 lb. hourly deveined and shelled by hand operators a tripling of production.

As shown in the picture, machine consists basically of two rotating tables, a deveining head, and shelling rolls. Operator places de-headed shrimp in clamping station, sand vein out. Then cam-operated air cylinder automatically closes top jaw portion of clamp onto shrimp body. Shrimp is locked in same position regardless of size.

Rotating table now carries shrimp to deveining head, where sand vein is removed by two saw-like cutting edges. Head automatically adjusts to size of shrimp, preventing too deep a cut in large shrimp, or too shallow a cut in smaller ones.

Clamp lock is then released and ejection mechanism transfers deveined shrimp onto second rotating table. Shrimp is fed, by another ejection mechanism, into a pair of special rolls.

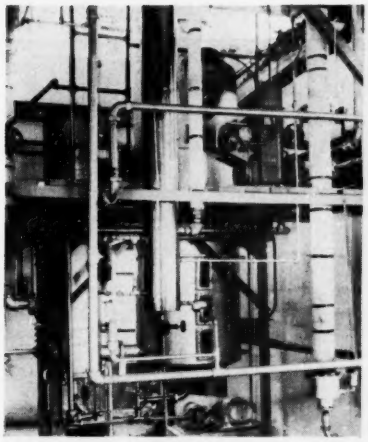
Here, shells and tail are stripped off and drop into refuse can while clean shrimp run down a trough to a water rinse. Then meat is ready for inspection and freezing or cooking.

Machine runs at very low power, since 110v. motors are fractional horsepower. Water feeds at various stages insure thorough cleaning. Location requirements and number of units operating determine table design. Patents are pending.

Idea for the machine originated with the seafood company, which cooks and packs shrimp and other seafood for local hotels and restaurants. Development engineers at Alpha Products Co. translated the idea into a practical unit. They are still working on an automatic conveyor to feed shrimp into the clamping station, to eliminate all hand operation and eliminate one more worker.

The inventors see a good market for the machine among canners of seafood, local packing services, and frozen food processors. Citing the high turnover among women who devein and shell, they point to specific savings in labor costs.

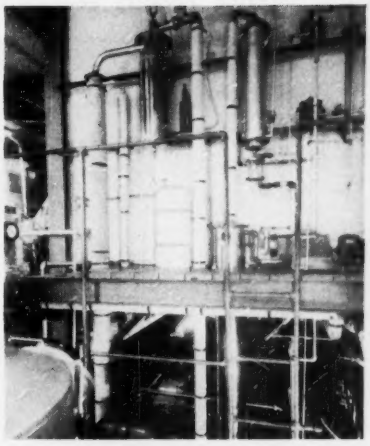
It has been noted (Nov. 1945 FI, p. 102) that shrimp deveining equipment was installed by the Colter Co. in Palacious, Tex., in 1945. This apparatus positioned shrimp in a V-shaped webbed-belt conveyor. Then vertical saw cut out the sand vein. This unit, however, did not incorporate the shelling operation.



Surpassed The Aim

← **EVAPORATOR** in which juice is reduced to a 7-1 concentrate.

RECOVERY UNIT→ for collecting and separating volatile fruit essence.



When their apple peels and cores posed a tough economic dilemma, Fischer Spiegel executives got busy and searched out a new concentrating process to utilize these materials. Cutting expenses was their target. *But their shot "went high" and—*

Instead of *Saving* Money They're *Making* It

IVAN C. MILLER
Editorial Consultant, "Food Industries"

In a determined move to reduce the cost of handling the cores and trimmings from its apple sauce canning, Fischer Spiegel Co. did a lot more—it came up with a process for concentrating fruit juices that now constitutes the plant's major operation.

Fact of the matter is that the apple juice concentrate, with the full flavor and aroma of the fresh juice, was so successful that the company has now augmented its concentrate line with grape juice and the juice of berries. These also have been highly successful, with the result that the production period of the plant has been greatly extended.

To put it briefly, the company's new operation is *making* money instead of merely saving it. Fischer Spiegel has found its gross figures—including profits—to be upped appreciably. Now for the details:

At the plant in Geneva, Ohio, built five years ago to make apple sauce by a continuous process, undersized apples, peels and cores, the leftovers from sauce processing, were being disposed of by simple dumping. But this was proving too costly.

True, the company considered making the usual byproducts as a means of utilizing this waste. But these products—juice, cider, vinegar, pectin and dried pomace—must be sold in a highly competitive market. And if costs are to be kept in line, such items must be processed in volume, requiring extensive equipment and buildings.

This dilemma set the company looking for a new product to be made from peels and cores, which could be processed in the minimum of space and would require the least capital investment in equipment in proportion to the value of the new product. In short, a money saver was sought.

A search of literature on the use of fruit trimmings revealed a pamphlet issued by the USDA's Eastern Regional Research Laboratories at Philadelphia. This publication discussed a method of separating and collecting the essence normally lost in the preparation of a fruit juice concentrate.

After the essence is separately concentrated, it is added to the cooled evaporated juice to restore the original flavor and aroma. Equipment for this process had already been designed and developed in conjunction with F. J. Stokes Co., also of Philadelphia.

Fischer Spiegel representatives visited ERRL and studied the pilot plant operation. And then they had a small commercial unit built and installed at Geneva.

Peelings constitute the bulk of the materials from which the apple juice for concentrating is obtained. The peel contains approximately 20 percent more sugar than the remainder of the apple and produces a more flavorful juice. Peels, small apples and cores are pulped by hammer mill and the juice extracted by hydraulic press. Screened juice is pumped to the essence removal and collecting system, which has a capacity of 250-300 gph.

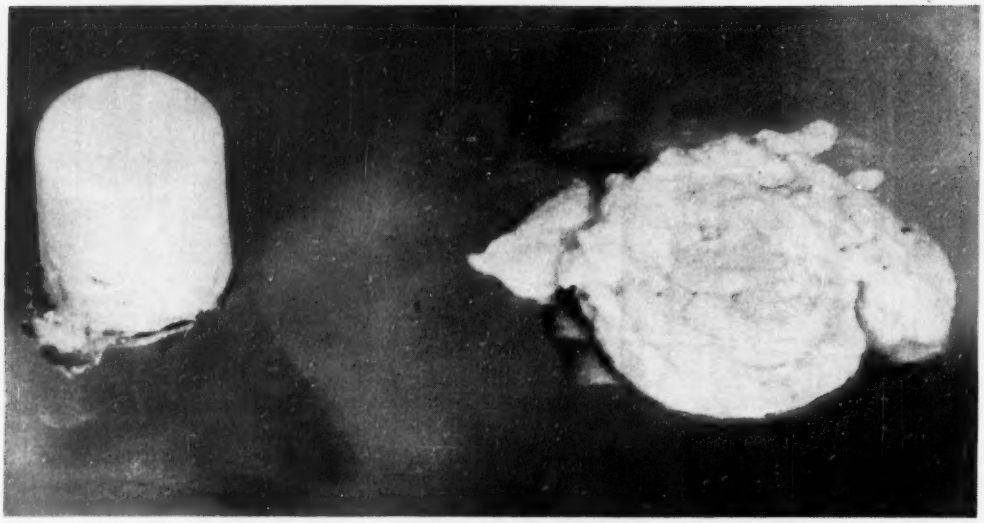
Technic Outlined

The essence and approximately 10 percent of the water content of the juice is vaporized in a single-effect evaporator. Between 10 and 15 per-

(*Turn to page* 174)

Don't Miss the Flowsheet

Graphic details of Fischer Spiegel's striking operation are presented in this month's special foldout flowsheet—pages 104-107. There you'll find all steps diagrammed in sequence, along with close-up photos showing the equipment in action.



GEL (left) was formed by treating milled pear waste with 0.35 percent $CaCO_3$ and curing. Pressing gel yielded juice which was then purified. Sample on right did not get lime treatment. (U. S. Fruit & Veg. Prod. Lab., Pullman, Wash.)

Refine Pear-Canning Waste For Use As Syrup Base

Pilot process yields sweet juice that is seen replacing portion of canning sugar. Waste disposal costs thus eliminated

A. M. NEUBERT, D. W. GRAHAM, O. E. OLSON, and C. L. BEARDSLEY

First three authors are with U. S. Fruit & Vegetable Products Laboratory, Pullman, Wash., Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, USDA. Fourth author is with Apple Growers Assn., Hood River, Ore.

Presently disposed of at considerable cost, soluble pear canning waste has now been purified for use as a syrup base on a pilot-plant scale at the Apple Growers Assn. cannery, Hood River, Ore.

The successful commercial recovery of the sweet juice, now foreseen, would enable pear canners to economically replace a large portion of refined sugar. Only enough sugar to bring syrups up to desired Brix would have to be added to the refined single-strength juice. And the hauling costs for much of nation's yearly 125,000 tons of pear waste would be eliminated.

The new process consists of milling pear waste, converting it to a calcium pectinate gel, and pressing. Resulting juice is deaerated, boiled, then treated with an ion-exchange resin, gelatin, and activated carbon to obtain a clear, colorless liquid, suitable for use as a sweetening ingredient in canning pears.

Forming the Gel

After milling raw, unpasteurized waste so it passed a ¼-in. screen, separation of soluble from insoluble solids was accomplished by a lime gelation process which resulted in a calcium pectinate gel. De-esterification of the pectin was brought about by action of natural enzymes within a pH range of 4.5 to 9.5. In the pH range 5.5 to 6.5 (obtained by adding 0.35 percent $CaCO_3$), temperature of the waste was raised to between 90 and 130 deg. F. and a suitable gel was formed after a 1-hr. cure. In the pH range 8.5 to 9.5 (obtained by treating waste with 0.15-0.20 percent CaO), firm gels were prepared within 10 min. at lower temperatures.

Juices pressed from these gels were free of earthy and bitter flavors and also could be purified economically because of low calcium content.

How Gel Is Pressed

The calcium pectinate gel was hydraulically pressed in a 17x17-in. rack-and-cloth press commonly used to prepare apple and grape juices. Cheeses were built in the usual manner. About one-third of the juice flowed as free run while building the cheese, another third during initial pressing, and the final third at increased pressures. Juice was clear. Gel pressed rapidly and efficiently without using filter aid or fiber. Yields of 75-80 percent, about 170-180 gal. of juice per ton of gelled waste, were obtained at pressures of 100-150 psi. Brix of the juice ranged from 10.5 to 13.1.

Immediately after pressing, the juice was deaerated and boiled. Then came the problem of acidity.

Controllable pH

The pH of pears canned in usual water syrup ranges anywhere from 3.8 to 4.6. It is apparent that the canner has little control over the pH, and therefore the flavor, of his product. But with juice of controllable pH as

a syrup base, final pH of canned pears can be held at optimum acidity within fairly close limits.

By using a single cation exchange treatment in a hydrogen cycle to remove calcium added during gelation process, it was found that a mixed effluent of the desired pH could be prepared. From 20 to 30 volumes of juice passed per cycle. The unfiltered juice was sufficiently free from colloidal impurities to permit easy flow through the column. The resin maintained its capacity satisfactorily during repeated cycles. Maximum exchange capacity per cycle was assured, since a large volume of juice passed through the column after the break-through to bring the treated juice to desired pH.

Considered pleasingly tart for pears canned in heavy juice syrup (30 deg. Brix) is a 4.2 pH. To get this as a final result, pH of juice used in preparing syrup was adjusted within range of 4.3-4.6, depending on acidity of raw fruit. Incidentally, in normal pH range for canned pears, flavor of those canned in juice syrup was considered slightly superior to that of control samples in water syrup.

Removing Color

A practically colorless juice is necessary if it is to be used as a syrup base. Employing an arbitrarily selected scale, it was decided that color of the final juice should be 1 unit or less. Color of freshly pressed juice ranged from 20 to 42 units. And color increased rapidly with increasing curing times.

Deaeration immediately after pressing reduced color of experimental batch from 33 to 27 units. However, in view of the not-too-large reduction, deaeration is not essential. Boiling of the juice proved most effective for stabilizing color. It actually resulted in precipitation of 20-28 percent of the original color.

A slight turbidity was produced by boiling, making the juice somewhat difficult to filter. So the deaerated, boiled, acidified juice was treated with gelatin at rate of 2 to 3 oz. per 100 gal. This caused rapid flocculation, permitting easy filtration, and removed as much as 45 percent of the residual color.

Final reduction of color to 1 unit was made by treatment with activated carbon. A single treatment of 0.5 percent commercial carbon reduced 100 gal. of juice.

Additional Study Needed

The many complications connected with the original amount of color present precluded a comprehensive study during the past season. Response to carbon treatment was not uniform. The carbon required varied considerably, and adsorption isotherms showed irregularities. Initial studies indicated that single-treatment dosages could be reduced about 70 percent by a 2-step, counter-current treatment. And it appears carbon can be reactivated by treatment with sodium hydroxide to further lower decoloring cost.

Additional studies are also required to determine the most practical pH for holding the milled waste when forming the gel. From 5.5 to 6.5 pH, the waste must be heated to between 90 and 130 deg. F., and a 1-hr. cure is necessary for a suitable gel. But the advantage is that calcium carbonate may be added before milling, so that one operation suffices for both mixing and milling.

In the pH range 8.5 to 9.5, firm gels can be prepared within 10 min. at lower temperatures. However, this range requires accurate control of pH.

Commercial-Scale Batch Made

To demonstrate commercial-scale practicability of the lime gelation process, a 3,500-lb. lot of pear waste was milled at 93 deg. F. with about 0.35 percent $CaCO_3$. After a 1-hr. cure, the gel was squeezed in a 48x48-in. press. No difficulty was experienced in building or pressing the cheeses. Cloths stripped cleanly from the press cake. The latter was dried simply by a single pass through a rotary steam tube drier.

Dollars-and-Cents of It

An accurate cost estimate of the process cannot be made until there is continued commercial-scale operation. But pilot-plant figures indicate that cost of materials—$CaCO_3$ or $Ca(OH)_2$, HCl (ion exchange regenerant), gelatin, carbon and filter aid—should not exceed $3.50 per ton of waste processed. Labor costs for collecting and inspecting the waste, and pressing and purifying the juice are estimated at $4.00 per ton when waste is available at 4 tons per hour.

Based on a yield of 1,500 lb. of 11-deg.-Brix purified juice per ton of waste, about 165 lb. of soluble solids would be recovered. Assuming these are acceptable, pound for pound, in place of refined sugar, value recovered from 1 ton of waste would be $13.20 (at current price of 8c. a lb. for sucrose in Hood River).

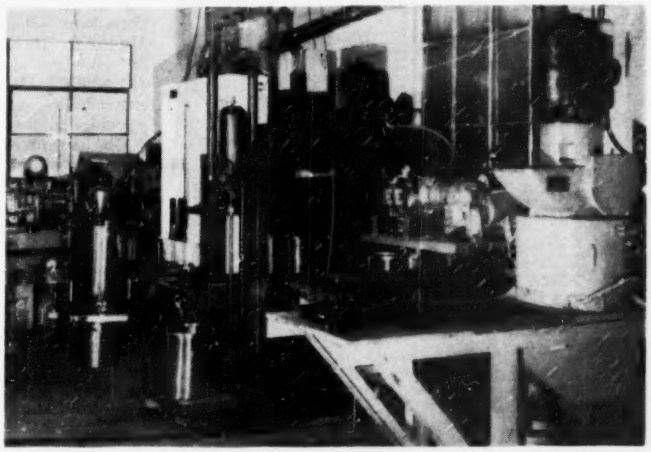
So, excluding amortization of equipment, about $5.70 per ton of waste would be realized, plus elimination of present cost of hauling to dump.

Adoption of the process would require a waste conveyor system, mill, lime proportioner, rack-and-cloth or bag press, deaerator (optional), heat exchanger, ion exchange columns, filters, and also pumps, piping, tanks and agitators for transfer, curing, mixing and holding the pulp and juice.

Acknowledgment

This is a report of study made under the Research & Marketing Act of 1946, conducted under cooperative agreement between the Apple Growers Assn. and the U. S. Fruit & Vegetable Products Laboratory. Patent applications covering the lime gelatin process have been filed by USDA. Appreciation is expressed to Wenatchee Foods, Inc., Wenatchee, Wash., in whose plant some preliminary investigations were made.

Inside Pilot Plant



LAB SETUP for pear waste studies at Apple Growers Assn. cannery. From left to right are laboratory bench, ion exchange equipment, hydraulic press, steam jacketed kettle, and hammer mill.

Production Innovations Cut Costs, Aid Quality

Improvements in forming, cutting, icing and pan deglazing save time, labor and waste in Florida bakery. Involve ingenious practical devices

R. E. CHIVERS
Assistant General Manager,
Fuchs Baking Co, South Miami, Fla.

Effective innovations have been made in the production of sweet rolls and the deglazing of silicone-coated bread pans at Fuchs Baking Co., South Miami, Fla. These supplement the company's advanced management practices and efficient bread baking operation (FI, Aug. page 72).

An unusually efficient production line for Sweeties has resulted from the addition of devices which improve quality and reduce costs. On this line, 1-lb. pieces of dough are sheeted and rolled by a molder, then dry-proofed for 45 min. After proofing, the dough again is sheeted into strips 7 ft. long and 6 to 8 in. wide. These strips are overlapped at the ends to form a continuous strip which passes through two more sheeting rolls to make it still wider and to further stretch its length. This thin strip yields rolls with more curl, better width and more filling.

Filling is applied to the dough strip by hand, and the strip passes under a spring-loaded V-shaped steel spreader developed by Fuchs. Then one side of the strip is picked up by a curler which rolls the strip longitudinally, with the filling inside. This machine is a motor-driven fluted cylinder extending diagonally across the edge of the dough conveyor.

Roll Cutter Has Kick-Out Bars

The continuous roll passes through a special rotary cutter devised by the bakery. This cutter consists of disk-shaped end pieces between which are mounted metal blades that form long V-shaped horizontal pockets around the axis of the cutter. Its unique feature is the use of steel bars which force the cut pieces of the dough roll from the V-spaces between the blades. There is a bar between every two cutter blades, and the ends of the bars extend through radial openings in the end disks.

The bar ends engage slides, or cams, as the cutter revolves. These cams hold the bars at the bottom of the V-pockets until they are on the down side of cutter rotation, then force them outward to push the cut pieces of roll from between the blades. The ejection is gentle, and is timed to take place a little beyond the bottom point of cutter rotation, in the direction of conveyor belt travel, so as to avoid breaking the rolls as they strike the belt.

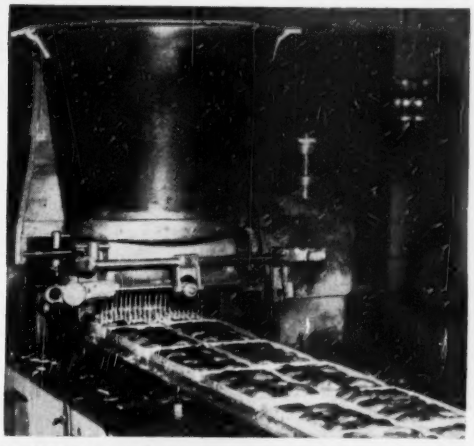
The cut rolls are put into pans manually, and the pans are racked at the end of the conveyor. Production speed is 50 packages of Sweeties per minute on this line, although 60 is possible.

There are ten workers on the Sweeties forming line. One

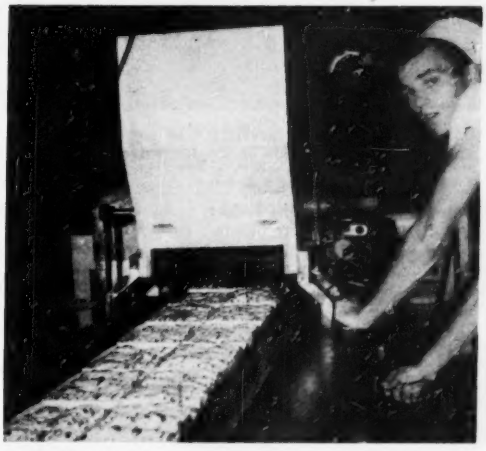
← **SEVEN-FOOT** dough strips, rolled from 1-lb. pieces, are overlapped on conveyor and fed through second set of rolls. After filling is applied, dough passes under spreader and is rolled up longitudinally.

REVOLVING CUTTER divides continuous roll into pieces, which are put into baking pans. Special kick-out bars actuated by cams push pieces from space between blades on cutter cylinder.

AFTER BAKING rolls are placed in open-top cartons.

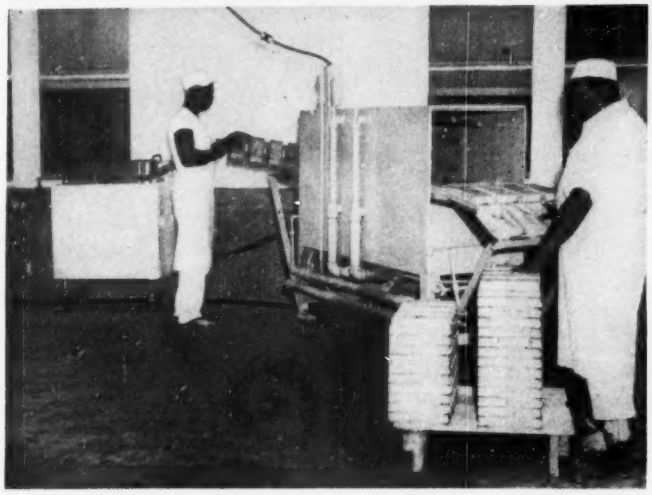


CARTONS go under icer. Spreader gives "hand finish."

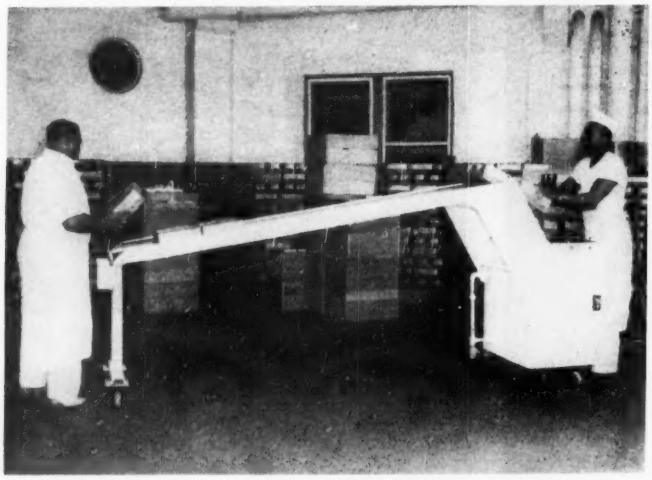


ICED ROLLS pass under home-made nut spreader.

Bread Pans Deglazed Quickly—and Reglazed



FAST pan deglazing involves only 5- to 10-min. soak in hot Dowanol DC solution in tank at left. Rinsing in converted dishwasher follows.



PANS are reglazed by inverting over silicone sprays in right-hand section of this machine. Pans drain on sloping board, are air dried, then baked.

scales at the end of the molder, one pans the dough for the proofer, one operates the sheeter, one spreads on filling, one is stationed at the curler, four panners handle 50 pans per minute, and one person does the racking at the end of the conveyor.

The panned rolls are proofed for 70 min., then they are baked, cooled and depanned. Next they are put into set-up cartons which pass on a belt conveyor under a machine that extrudes icing over the top. As the rolls leave the icer, they go under icing spreaders made of short thin fingers of spring steel, about ½ in. wide, to give the icing a hand-finished appearance.

Nut Spreader Stops Waste

Nuts sometimes are spread over the iced rolls, and this is now done by a newly developed home-made machine at considerable saving in cost. This spreader consists of a plywood hopper (eventually will be made of stainless steel) with a motor-driven feed roller in the bottom. The roller is a 3-in. wooden cylinder to which are fastened longitudinal strips of ½-in. angle iron to form a series of deep grooves. The nuts fall into the grooves and are discharged from the hopper without breaking or crushing as the roll turns.

The nut feeder is extremely simple, yet saves $75 a day by reducing labor and eliminating waste of pecans. Formerly, a girl scattered the pecans onto the Sweeties by hand, and wastage of nuts has run as high as $65 worth in a day.

At the end of the conveyor belt which carries the rolls under the icer and spreader, the Sweeties are racked to permit drying for 20 min. then the cartons are machine-wrapped in cellophane and heat-sealed.

To provide consumers a variety of flavors, the filling in the rolls is varied each day. Cinnamon cream, coconut, chocolate, butterscotch and orange fillings are used. Further variation is obtained by applying cherry and pineapple toppings, three fruit-topped items being produced a week.

Pan Greasing Eliminated

Silicone-glazed bread pans have been used successfully at Fuchs to eliminate pan greasing. And an improved method of deglazing the pans has recently been adopted.

The pans are heavy and are aluminized. Their ruggedness makes them highly suitable for automatic handling, and the aluminized surface gives good results with the silicone coating. An average of 290 bakes are obtained with one glazing, and the messy operation of pan greasing is eliminated, together with the smoke which grease produces in the oven.

Pans Deglazed in 10 Minutes

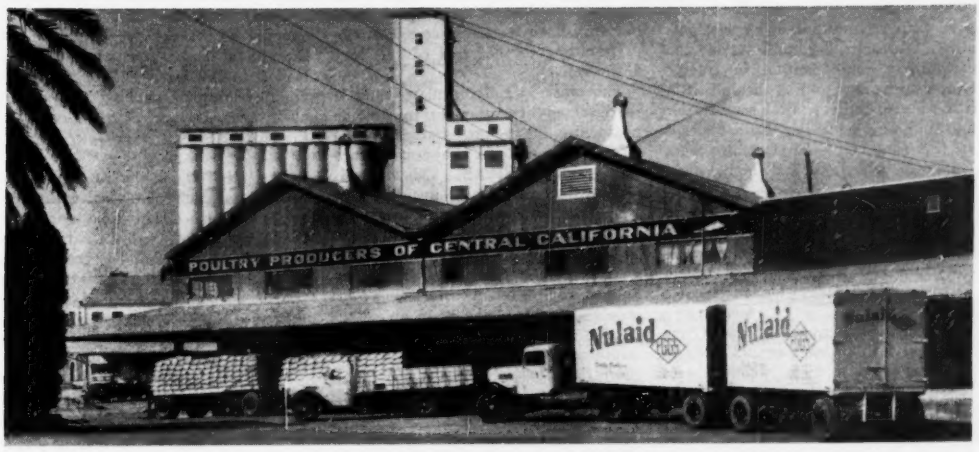
Pans are now deglazed in the extremely short time of 5 to 10 min. by immersion in a hot solution of Dowanol DC, this chemical dissolving the glaze. The silicone coating formerly was removed by boiling the pans in a caustic soda solution for 8 hours.

The deglazing is done in a 50-gal. insulated tank equipped with a steam coil and with perforated pipe through which compressed air discharges to agitate the solution.

Converted Dishwasher Used

After the glaze is dissolved, the pans are passed through a converted automatic industrial dishwasher which then rinses them with clear water heated by injected steam. Then the pans are air dried and run through the glazing machine.

In the glazer, the pans are inverted over nozzles which spray the silicone inside them. This is followed by draining, after which the pans dry for 1 to 1½ hours on bread racks. Then the pans are baked to cure the glaze.



ASSORTED type truck carriers make up poultry product fleet that provides three-way hauling service.

Whole Eggs Delivered Whole

Truck and trailer fleet operated by California co-op gathers eggs from members for packing, then hauls them to the heavily populated San Francisco Bay area

AUTOMOTIVE EQUIPMENT has made possible the highly efficient distribution of eggs by the Poultry Producers of Central California. Organized in 1916 and beginning operations in 1917, this group has grown into the first successful egg-marketing cooperative in the United States.

The association now has over 11,000 members and operates in the California territory roughly 200 miles north, south and east of San Francisco. In that area the association is serviced by 40 branches and 15 agencies.

Last year its egg sales alone consisted of about 1,500,000 cases valued at approximately $28,000,000. About 40 percent of that total, or 600,000 cases valued at $11,200,000, were picked up by the association's trucks. These eggs were graded and packed in eleven association plants, and 50 percent was moved to California markets in association trucks. All deliveries to retailers were also made in association trucks.

Feed Also Distributed

In addition to the egg business, this group's feed department last year supplied its members with 272,000 tons of feed, valued at approximately $27,000,000. Because feeds are not as perishable as eggs, association trucks moved only 25 to 30 percent of the feeds. Locally-produced grains and feeds are picked up by the trucks and delivered to the nearest railhead and transported to mills and branches by rail, except in cases where rail transportation is not practical or is nonexistant.

Use Large Fleet

The distribution of the yearly volume of $11,200,000 worth of eggs and $8,100,000 worth of feeds requires a fleet of 140 pieces of automotive equipment. The work done by the trucking equipment in egg distribution may be divided into four general classifications: (1) Picking up the eggs at the farms of the members and delivering the eggs to the nearest branch; (2) transporting them to the packing plant; (3) delivering them to the distributive branch; and (4) delivering them to the customer retail outlets.

In general, straight (two-axle) pick-up trucks are used to collect the eggs from the farms and to deliver them to the small retail outlets. Tractor-trailers, handling full legal-limit loads, are employed for the hauls between receiving branches and packing plants and between packing plants and distributive branches.

Cold storage facilities are provided in all receiving branches, also in all packing plants except those located in the coastal areas. Such facilities are not provided in the distributive branches, since the eggs move out promptly to the retail outlets.

Refrigerated trucks are employed in all four steps of the automotive distribution, with extent of the operations depending on area temperature averages and the length of time the eggs remain in the trucks. For example, refrigerated pick-up and delivery trucks are used in the San Joaquin valley but not in the Petaluma area.

Arriving at the receiving branch, the large, white Leghorn eggs produced in "The World's Egg Basket" area of Sonoma County are then put under refrigeration ready for transportation by tractor-trailer to the nearest packing plant. Here they are candled, graded and packed for final transfer to the distributive branch.

Use Fiber and Wood

Eighty-five percent of the association's sales eggs are packed in fiber half-cases, which are 12 in. square and 14 in. high. The other 15 percent are packed in wooden cases, 26 in. long, 12 in. wide, and 14 in. high.

The bodies of both the pick-up and delivery trucks and the over-the-road trailers are designed to carry even rows and tiers of either cases or half-cases of eggs.

In order to haul the greatest possible load as a means of securing the lowest unit transfer cost, the association's latest tractor-trailer unit takes the form of a double-bottom (a tractor and semi-trailer pulling behind it a four-wheeled trailer). Both semi-trailer and four-wheeled trailer van bodies are of the same size—21 ft. 6in. long, 7 ft. 6 in. wide, and 7 ft. high.

Carry Heavy Loads

Each body carries 882 fiber half-cases or a total of 1,764 half-cases to the tractor train. These are loaded 21 cases long, 7 cases wide, and 6 cases high.

When wooden cases are used, each body carries 396 cases or 792 cases to the tractor-train. The wooden cases are loaded 9 cases long, 7 cases wide, and 6 cases high, with three tiers of cases loaded with the long sides crosswise of the body at the rear.

At an average weight of 58 lb. to the case, the total tractor double-bottom payload is 45,936 lb. With the equipment having an unladen weight of 30,864 lb., the gross laden weight of the train is 76,800 lb. carried on five axles. One of its regular runs is a daily round trip of 112 miles between the packing plants at Santa Rosa and Petaluma and the distributive branch at San Francisco.

Starting from Santa Rosa with the semi-trailer loaded with eggs, the unit stops to pick up the four-wheeled trailer loaded with eggs at Petaluma and hauls both loaded trailers to San Francisco.

Return with Supplies

On the return trip from San Francisco, both trailers carry a backload of supplies. The four-wheeled trailer is dropped at Petaluma to unload the supplies and reload with eggs, while the tractor takes the semi-trailer back to Santa Rosa for the same operations preparatory to the start of the next day's run.

The truck is fully insulated and is refrigerated by water ice to provide a starting inside temperature in the 60's with the outside temperature running about 100 deg. F. This range is not always maintained, due to losses when the side and rear doors are opened an excessive number of times.

The refrigerant consists of a 100-lb. cake of water ice carried in an insulated compartment, which juts outside the front of the body above the top of the driver's cab. With the width of the compartment slightly more than that of the cake of ice, this arrangement conserves the interior body space by making the rear or back of the compartment practically flush with the inside insulation of the body front.

Ice Loading

The 100-lb. cake of ice can be put into the compartment either from the outside through a roof hatch or from inside the body. And it is held in place by a hinged door on the rear surface of the compartment at the left end. All the newer trucks are loaded from the outside. At the right end of the compartment is a small electric fan driven from the truck's ignition and lighting storage battery.

Beneath the ice and fan compartment is a shallow recessed space extending down to the floor of the body. Inside the recess from the bottom of the ice tank is a copper drain tube bent in serpentine form down through the floor of the body to discharge onto the ground.

The recessed space is covered with a piece of sheet metal all the way to the body floor, except for a rectangular opening at the extreme bottom. The sheet-metal cover prevents the cases loaded to the front end of the body from striking or rubbing the copper drain tube.

How It Works

In operation, as the ice melts and the ice water circulates down through the serpentine drain tube and onto the ground, the small fan draws air from the floor of the body through the rectangular air intake at the bottom of the recess and up around the drain pipe and over the ice cake. It is then discharged through the fan aperture across the top of the load.

To help retain the cold air inside the body when the doors are opened, the fan is operated with door switches. The fan is automatically shut off by the switch when any door is opened so that the cold air will not be pushed out of the truck.

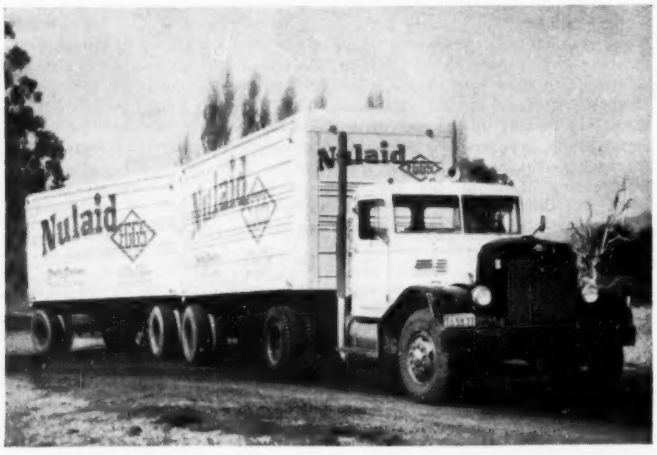
The truck body is fully insulated. Two inches of Fiberglas insulation are used in the side walls, front and end. There are also 2 in. in the roof and 4 in. in the floor. The ice compartment is likewise insulated with 2 in. of Fiberglas.

One of the particular problems in the handling of eggs by automotive equipment is the prevention of their breakage in transit. Commonly, the breakage will occur in the shifting of cases when the body is not fully loaded, the cases hitting both sides, the front, rear and roof.

However, with the association trucks and trailers, the problem has been solved by an ingenious system of criss-cross slats and battens. The slats run lengthwise along the sides of the body, one on each side, for the full inside length of the body. They are placed on the floor of the body and between each tier of half-cases. Notches are cut in the slats every 12 in. along their lengths.

The battens are crosswise pieces whose length is the inside width of the body, 7 ft. 4 in. When these are dropped into the notches in the slats along both sides of the body, they prevent the half-cases from shifting either forward or backward.

The slats are made of oak, 1 in. wide and 4 in. high, with the notches 2 in. deep and 1 in. wide. Each batten is also made of oak, 1 in. wide and 4 in. high, with a notch 2 in. deep cut out of the bottom at each end so that it will drop neatly into the notches along the length of the slats. The top of the batten is thus 4 in. above the floor or the top of each row of cases, thereby forming a pocket 4 in. deep to prevent the cases from sliding in any direction thus cutting breakage to a minimum.



DIESEL-ENGINED tractor-and-double-trailer units each carry a payload of 45,936 lb. of eggs in 792 wooden cases or 1,764 fiber half-cases.

We Think . . .

■ Systematic Testing of Packaging Materials is Good Precaution

There are relatively few packaging laboratories, and consequently little systematic inspection of incoming packaging materials in food plants. This dearth of inspection is a tribute to manufacturers of these materials, as well as to the purchasing agents who fill out the order forms. For mistakes on the part of either could cause chaos on the packaging lines.

But now and then there is a slip-up, as occurred in a tomato products plant. In this instance, the first half-hour's run with a new shipment of glass containers resulted in enough breakage to shut the lines down. And the emergency necessitated packing in No. 10 cans until more bottles could be shipped by express. This trouble could have been foreseen had there been available adequate test methods for determining the "stability" of the containers before putting them onto the production line. Fortunately, such procedures now are in process of development.

The number of important qualities and dimensions of packaging materials, containers and closures of various types that need to be right are too numerous to mention. And many, many things could be sufficiently wrong to cause trouble on the line or to adversely affect the quality of the product after it has been packaged.

Just by way of examples: Labels could be sufficiently porous that suction pick-ups on labeling machines would take more than one at a time from the pile. Cartons might be used so soon after printing that the ink odor has not dissipated, resulting in the introduction of off-odor or off-flavor in the product. The melting point of the wax on wrapped materials might be so low that heat-seals open at room temperature on a hot day. Bottle openings could be too small or too large for the filling machines, or the containers might be out of round or of incorrect height. Closures could be of wrong dimensions. And so on.

Systematic inspection of packaging materials for critical qualities is something that more food plants could profitably undertake. Admittedly, procedures have not been worked out for all tests. But there is no time like the present to start.

Meanwhile, it might save valuable time and product if a 30-minute supply of a new shipment of a packaging material were put on the production line as soon as it arrives. Then if anything is wrong with the machine performance of the package, the trouble will be spotted in time to do something about it before the stock of usable material is exhausted.

■ More Than Meets the Eye Behind Higher Profit Margin

In the "popularized" annual report of General Mills, for the fiscal year ending May 31, are some little facts with a lot of meaning. Net earnings per sales dollar were 3.3 cents, compared to 2.8 cents for the previous year. Number of employees remained the same. Employment costs continued to rise.

These facts indicate increased worker productivity, a highly important achievement because it is the best way for food processors to increase unit profit margins in the face of rising wage rates.

It is not surprising that the milling company has been successful in this respect. It has reinvested some $30 million dollars to improve operations in the past five years. It has spent a lot of money to modernize production facilities, and at the same time financed an extensive research program. Much of the increase in productivity has come from more efficient materials handling through palletizing and installation of bulk handling equipment.

But there is something else—so remote from the production line that its effect on productivity may be surprising. We refer to the effective merchandising operations of General Mills. The significance of this lies in the fact that plant employees are assured of plenty of work to keep them all busy and steadily employed. No one need fear that his hours will be cut next week if he exerts an honest effort this week, nor even if labor-saving equipment is installed in his department.

So here is an added bonus from maintaining a strong selling effort and letting the fact be known among plant workers.

Another factor in the improvement in General Mills' profit margin—in the face of declining U. S. flour exports—has been its product-diversification program. It has had phenomenal success with the Betty Crocker electric iron. And while this does not mean that food processors should make appliances or other non-food items, it does show the value of variety.

As is usually the case, the success of this company stems from many things. And they were planned—they didn't just happen.

■ F&DA Detective Work Pays Off in Olive Oil Case

We commend the Food & Drug Administration for its part in running down a group of unscrupulous vegetable oil distributors. About three years ago, F&DA found various blends of olive oil on the market which it suspected contained little or no olive oil. However, they responded to chemical tests as if they had as much olive oil as claimed on the labels.

Chemical investigation in the government laboratories revealed the normal amount of squalene, which is one of normal components of olive oil. But further investigation disclosed that refined squalene, purchased from a reputable vitamin factory, was being added to peanut oil to make it appear that the blend of oil actually had the claimed amount of olive oil in it.

About a year later, Dr. Jacob Fitelson, F&DA chemist, found a hidden "marker" which, with the cooperation of the

vitamin manufacturer, could be added to the squalene that was sold to the unscrupulous oil blenders. Interstate shipments of the suspected oil blends subsequently were picked up with the marker and court proceedings instituted.

Food & Drug won its cases in the two Federal courts where civil and criminal action was undertaken, and the decision was upheld early this year by a court of appeals. One of these cases was carried to the Supreme Court, and in May the Food & Drug Administration was upheld again.

As a result, two corporations and eight individuals were found guilty and fined a total of $24,000. In addition, the convicted individuals received suspended jail sentences.

Thus we find another racket successfully broken up. And having made its olive oil evidence stick, Food & Drug Administration continues to protect the American public with the effectiveness and fairness for which it is famous.

■ Bakers Unfortunate Victims of People With Bread Axes

The commerical loaf of bread certainly takes a beating at the hands of people who seek publicity or who have an axe to grind. The latest reflection on the quality stems from publicity given to a so-called "new" type of bread said to contain appreciably more flour than the usual commercial loaf.

An analysis of this bread, according to authorities in the baking field, indicates that it merely reverts to the old simple formula of flour, water, yeast, salt, a little sugar, and shortening. This means the elimination of milk, yeast foods, soya flour, potato flour, or similar ingredients which have been added to the basic bread formula to prolong freshness, increase loaf volume, intensify crust color, add flavor or impart other special characteristics which consumers like and buy. The result is a loaf that is relatively heavy and compact, like the product formerly identified as "farm" bread.

The commercial bread formula has long been the butt of criticism from people who make ingredients which can be used in bread. Because of the tremendous quantity produced daily, bread offers an outlet for a large volume of any substance which is used in it. There is little doubt, for example, that the bread baking industry could help solve the potato surplus problem if all bakers produced "potato bread." And, of course, the surplus of powdered milk would be pretty well taken care of if every baker in the country would use maximum quantities of this ingredient in his formulas. Then we find manufacturers of emulsifiers and conditioners eyeing the baking industry as a great market, with the shortening manufactures ready to complain that use of such "chemicals" in bread reduces the amout of shortening required.

Yes, the bread baker certainly catches it from all sides. Yet he is in a position to know better than anyone else what kind of bread the public prefers—or at least buys. And he knows how much cost can go into a loaf before housewives decide that the price is too high and consequently reduce their purchases.

■ It Pays to Help New Employees Get Started Right

Receiving new employees in a manner that makes them feel welcome and eases their adjustment to company operation is an important matter. Too few food company managements have studied this problem and prepared adequately to meet it.

We are inspired to discuss this subject by pamphlets recently issued by one of our chemical contemporaries. These do an exceptionally fine job. They lead off with a greeting to the newcomer. They explain the problems of entry into the plant, suitable work clothes, safety shoes, goggles, safety aids, lockers and other personnel conveniences. They introduce the newcomer to his immediate foreman and explain what the foreman is ready and anxious to do for the benefit of the new employee.

But the booklets do not stop there. They go on to describe relations of the company to its workers, the insurance, retirement, social security, and other benefits and allowances. They give in simple frank form the information which most companies forget to transmit to their workers. We suspect that such forgetfulness may account for many minor grievances which grow to major significance.

Perhaps every food company should have one of its experienced men pretend some day that he is just a newcomer. Let him approach the plant in pretended ignorance of company practices and policies, and make note of the types of information he needs to help him.

The cost of any employee is high enough to justify any reasonable effort which will make him a more happy and more useful worker.

■ Relative Transportation Advantages Need Frequent Restudy

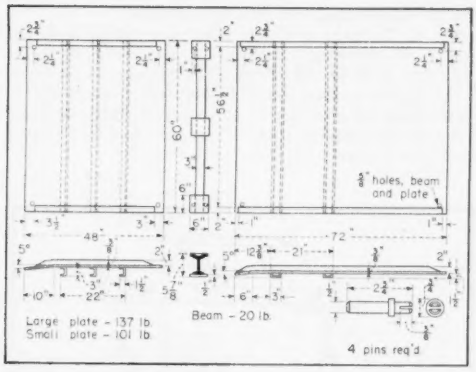
Food processors often can save considerable money by critical analysis of the advantages of one form of transportation against another. The principal competitors seeking this business are the railways and the truck companies. Both groups need frequent study in order that the lowest delivered cost be reached and maintained. It must not be forgotten that the company with the lowest delivered cost often gets the business in these days of intensive competition between different foods.

During the past year or two, there has been a large shift from rail movement to the use of trucks and boats for hauling processed foods. For all classes of industrial goods, highway movements increased 125 percent in the past 10 years, compared to only 50 percent for rail shipments.

Processors must remember that door-to-door hauling by trucks gives a substantial advantage for many foods, even though the nominal intercity rate is not very different. There may even be some advantages in the factory itself if the outer container for truck handling can be lighter or cheaper than those needed for rail haul. Certainly, trucks and trailers equipped with zero-temperature mechanical refrigeration offer frozen food packers quality protection not available in railway cars with ice and salt refrigeration.

Each of these factors must be carefully considered in evaluating relative carrier costs.

PRACTICAL IDEAS



Readily Moved Lightweight Truck Ramp

Loading over-the-road trucks from a fixed platform using lift hand trucks has been eased by the development of a three-piece, lightweight, magnesium ramp, at the Maxwell House plant, Brooklyn.

Variations in truck-floor elevations necessitated the ramp. Trucks loaded at Brooklyn vary in floor height from flush to 14-in. above the platform level.

Previous plates used were unsatisfactory in that they were heavy and dangerous to use—especially when the difference in elevations was appreciable. Required was a ramp that would be safer and one that could be readily stored when not in use.

As the sketch above indicates, the equipment consists of two diamond-tread magnesium plates and a magnesium I-beam. Each plate is 5 ft. wide, to conform with the step width. One plate is 4 ft. long, the other 6 ft. Four short movable pins or pegs are attached to the step.

Reinforcing channels on the larger plate are set with legs facing up. This construction permits using the plate at heights of as little as 4-in. above the loading platform.

Experience has proved that best results are obtained by using the 4-ft. plate alone (with the truck 2 ft. away from the platform) for any rise less than 4 in. The 6 ft. plate is used for rises of from 4 to 6 in.

All rises above 6 in. and up to 14 in. require use of both plates and step. This arrangement is varied to give the easiest possible loading ramp. For rises up to 9 and 10 in., the 6-ft. plate is used first, followed by the shorter plate. For extreme heights, the reverse order is utilized.

Holes in the corners of the plates and through the steps all match, so that no matter what combination is used the pins drop easily into place to make everything secure. The necessary four pins should be attached to the step in such a way that they cannot be lost.

This loading system was devised with the thought that two men could handle the large plate without difficulty. In practice, it has been found that this piece is often handled by one man without real strain. This is possible, however, only because of certain skill in handling that has been developed.

With this equipment, platform men can assemble a sturdy, safe ramp for trucks of any height in less than one minute, and they are most enthusiastic about it.—*Clarence Gates, Maxwell House Coffee, General Foods Corp., Hoboken, N. J.*

$25 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get additional pay of $25.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

JULY PRACTICAL IDEA voted best was "Four Hints for Glass Jar Users." It was submitted by W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn., and Ivan C. Miller, FI Consultant.

A Little Tape Makes a Big Saving

Reinforcement of plastic trays with a new industrial tape has netted average savings of $87 per week at one plant, Johnson Foods, Inc., Oshkosh, Wis.

We make prepared foods (salads, beans, cole slaw, and similar products), package them in plastic trays, and deliver them to retailers within a 100-mile radius of Oshkosh. Retailers sell the food by the pound and return the empties.

In circulation are approximately 12,000 trays, costing $2.25 each. Breakage on them was running an average of 10 a day. Now it is less than 10 a week.

This reduction was accomplished by a new filament tape that is used to reinforce fiber-board cartons and to bundle heavy metal and wood parts for shipment.

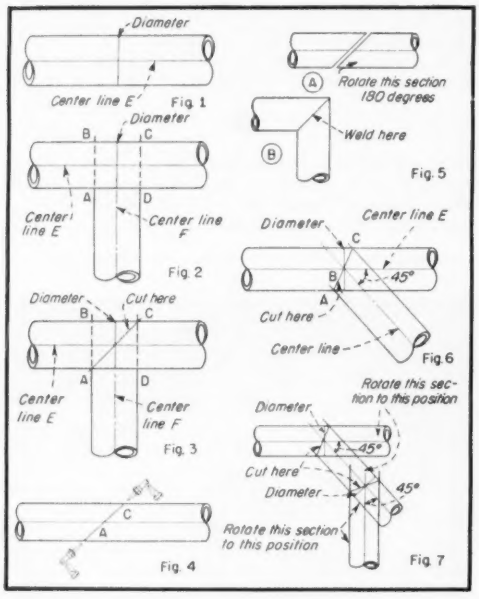
We adopted the tape as a reinforcing band around the

top of the plastic trays, using 2½-in bands about 2 in. apart. The bands completely encircle the trays. They are applied by the food packaging personnel during the slack periods.

The transparent variety of tape is used on both our transparent and white plastic trays. Other tape colors, including, blue, red, white and black are available.

Loaded trays range in weight from 8 to 15 lb., depending on the tray size and nature of the food. The tape has to help contain that load, and it must withstand exceptional conditions—complete immersion in the washing, temperatures up to 245 deg. F. in the sterilizing process, and the normal cold temperatures of retailer's refrigerated cases.

Made with an acetate film backing reinforced with thousands of parallel rayon filaments which run its full length, the tape ("Scotch brand, Minnesota Mining & Manufacturing Co.) has a tensile strength of 175 lb. per in. of width, is flexible, and is thin (10 mils).—*C. Edgar Johnson, President, Johnson Foods, Inc., Oshkosh, Wis.*



Hints on Making Welded Pipe Turns

Here is a simple and time saving method to lay out bends of any angle and any number of segments to make useful equipment with pipe. Even those who work with pipe only occasionally should find this method easy.

On a piece of brown wrapping paper, cardboard or wood make a full-size drawing of the pipe. The only measurement needed is the diameter. Then, following the above sketches as a guide, proceed as follows:

Fig. 1. Draw the pipe as though it were a flat piece of steel. Draw the diameter full size, then put in Centerline E.

Fig. 2. Next draw the point as you want it. Centerline F should be an extension of the diameter. Letter points "A," "B," "C," and "D."

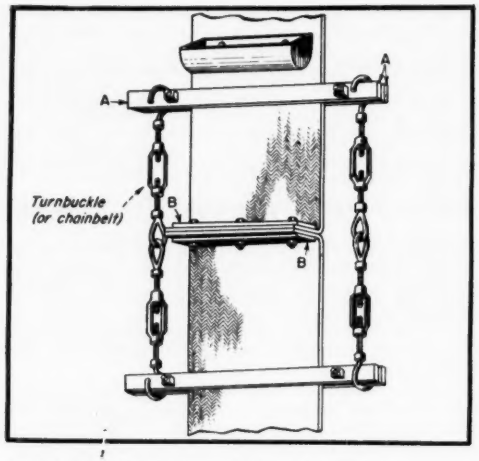
Fig. 3. Join Points A and C. Lay the pipe over the drawing, mark the Points A and C, and draw line AC all the way around the pipe.

Fig. 4. Use the same nozzle and flame adjustment employed for cutting steel plate of the same thickness. Hold the pipe as you would a saw. This is called a 45-deg. miter cut.

Fig. 5. Take one of the sections, as shown at (A), rotate it 180 deg., and the ends fit perfectly to form a right angle as in (B). Any slight gaps caused in cutting can be readily closed with welding rod metal.

Fig. 6. To make a 45-deg. bend, proceed as in 1, but instead of extending Centerline E as in Fig. 2, locate Centerline E at 45 deg. Then follow through as formerly.

Fig. 7. For gradual bends, follow steps given in Fig. 6, on the basis of small angles at each cut. This particular sketch shows a 90-deg. turn.—*From item in Linde "Tips," Linde Air Products Co., New York City.*



Quick Tightening of Bucket Belt

An easy and effective method for tightening bucket elevator belts in place and joining the ends after the slack is removed is practiced in the Taylor Reed Co. plant at Glenbrook, Conn.

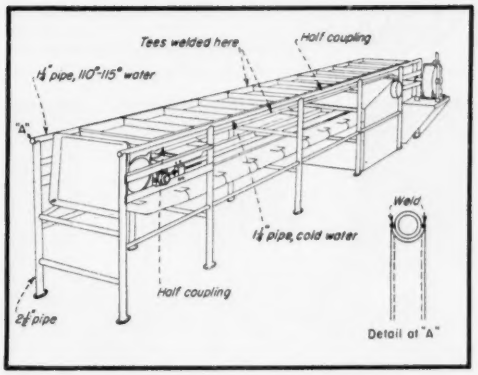
Four steel straps (A) are cut about 8 in. longer than the width of the belt. Two ½-in. bolt holes are drilled in each strap, equidistant and far enough from center so that the belt fits between the bolts.

These straps are then placed in pairs across the belt, several feet above and below where the belt is to be joined (see sketch).

Bolts are inserted in the holes and tightened enough so that the straps grip the belt firmly. Chain hoists or chain and turnbuckles are then hooked to the upper and lower projecting straps on each side. The belt is tightened by shortening the distance between the straps with the hoists.

Two pieces of scrap iron, ½-in. wide, (B), are cut to the same length as the belt width. These are used in joining the belts ends. Four or more matching bolt holes are drilled in the straps, depending on the width of the belt. The lengthwise edges to be placed next to the belt at the joint should be rounded. When the belt is stretched the ends are brought together with the lap facing away from the pulleys (sketch).

The straps are then placed on the laps and held firmly by grip pliers while holes are made in the belt laps to allow passage of bolts. When the bolts are tightened and the pliers removed, the hoists or turnbuckles can be slackened from the tight joined belt and the draw bars unbolted and removed—*Ivan C. Miller, Editorial Consultant, "Food Industries."*



Pipe Framework Used As Water Lines

There are many advantages to be gained by planning your water-line hookups—instead of running them in to your equipment haphazardly.

An example of "planned piping" is shown in the accompanying sketch. It illustrates how water lines were integrated within the framework of a viscera inspection table. Not only do the incorporated lines service this piece of equipment, but they also service adjacent machines simply and economically.

The framework is fabricated from piping, the vertical supports being 2½ in. and the horizontal members 1¼ in. dia. The two top horizontal pipes are nested, within the hollowed verticals, and welded as shown in detail (A) of the sketch. A few welds closed up the 1¼ in. pipes so they could take water under pressure.

Tees were welded in the center of the pipes for water admission and equalization of pressure. Half-couplings were welded on the under side of the pipes between the vertical standards. Of ¾ in. dia., these couplings serve as "take-offs" for adjacent equipment needing cold and tempered water. The latter installations are under the table platform so that no overhead piping is seen, thereby improving the appearance of the unit.

Water at 180 F. temperature is required on the viscera table for pan sterilization purposes. The pipe carrying it is laid in the center of the lower section of the table. In this manner, it is convenient, yet not in the way.—*Frank Cowan, Chief Engineer, Arnold Bros., Inc., Perry, Iowa.*

Cooler Box Nips Peak Load

A serious production problem, created by the usual big weekend demand for bakery products, has been solved by the installation of a 25 x 25 ft. walk-in refrigerator in the central bakery of Miller Groceteria Co., Denver.

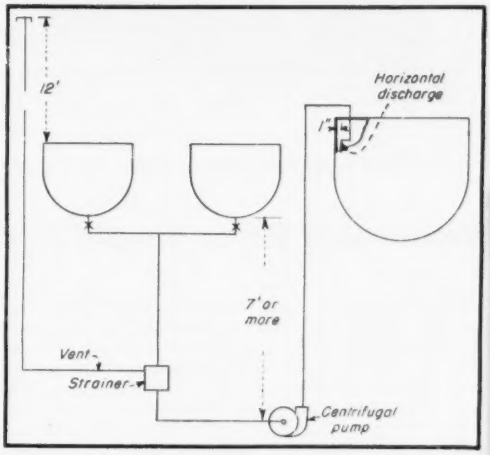
The company, operating 17 large supermarkets in the Denver area, was having trouble satisfying its store managers' demands for weekend supplies—even though the plant operated 24 hr. on Friday.

But installation of the big walk-in box, located midway in the bakery near the bread, cake, and pastry departments, did the trick. With a 7½-ton condensing unit, and four overhead finned self-defrosting coils, the cooler is "overpowered" so that it is possible to pull the temperature down to 10 deg. F. Standard operating temperature is around 35½ deg. F.

In fact, the cooler is capable of accomplishing a 50 deg. F. temperature variation.

With this box, it is possible for each of the bakery departments to utilize slack periods, when no rush production is demanded, to make up additional baked goods to be held in reserve for the rush. Thus, through the week, "overproduction" is scheduled for each department. Cakes, cookies, coffee cakes, breakfast rolls, and bread are made up in dough form, ready to bake, placed in trays on stainless steel racks, and then immediately wheeled into the refrigerator.

This way, it is now possible to meet special requests from stores subjected to heavier-than-usual buying—and without interferring with regular Friday production. With these low temperature facilities, any baked product can be kept for indefinite periods, ready to fill in the breach.—*Robert A. Latimer, 17 Corona, Denver.*



Tips on Improving Syrup Pumping

When heavy liquids such as chocolate syrup are to be heated in make-up kettles and transferred to holding kettles by a centrifugal pump, you can improve the operation by taking certain precautions.

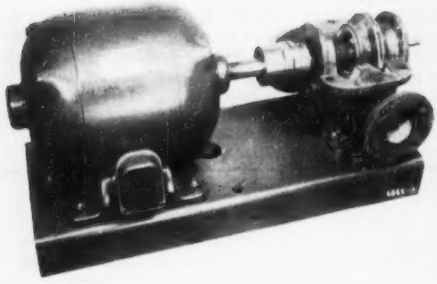
The pump will not become air-bound if located far enough below the kettle to provide at least a 7 ft. head. When the distance is less there is much greater probability of air or vapor binding.

Next, a strainer should be placed in the line between the kettle and the pump (see sketch). A coarse screen is usually sufficient. It should be noted here that if an operator inadvertently closes the drawoff valve from the kettle while the pump is running, the screen will collapse. But if you vent the strainer, this won't happen, unless the vent becomes clogged.

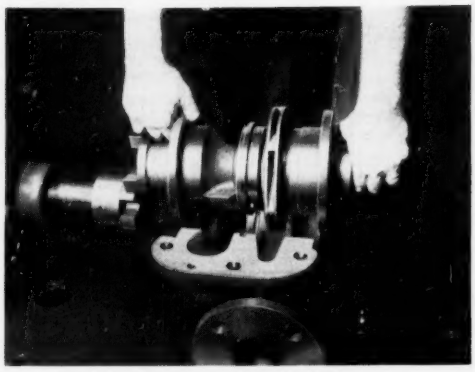
Your vent pipe can be ½ or ¾ in. It should extend 12 ft. or more above the top of the kettles, and end in a T, with reverse elbows. This arrangement minimizes the possibility of dust entering the vent pipe. If less than 12 ft. above the top of the kettles, a hydraulic ram effect may occur on occasions and force liquid out the top of the vent. So don't place a hand valve in this vent pipe.

The delivery pipe from the pump should not discharge directly into the liquid in the holding kettle. For this would incorporate air in the liquid. The end of the delivery pipe should be bent to the horizontal, with the pipe opening within 1 in. of the kettle side. The liquid then issues against the side, and flows down without splashing and dragging air. In fact, any air entrapped in the liquid in the line escapes as the liquid flows down along the kettle side.

Food Equipment News



Pump's split housing permits . . .



. . . easy access to rotor assembly

Removable Rotor Simplifies Maintenance A

Field maintenance is reported eliminated in a new line of small, standardized, general service pumps. This is accomplished by designing a pump in which every working part—every part subject to wear—is contained in one easily removed rotor assembly.

It takes time, tools and skill to tear down a conventional pump to replace individual bearings, wearing rings and other parts. In the new unit, all parts except the bare pump casing are contained in the rotor assembly. When maintenance is necessary, you simply remove the top cover and end plate studs, lift out the assembly, and drop a new one in place.

The casing is horizontally split for easy access without breaking piping connections. All parts are interchangeable, and they are available for immediate shipment from factory stock.

Also considered in designing the pump were two other maintenance chores—periodic lubrication, and the occasional repacking of a stuffing box. Simple mechanical seals replace the stuffing box, and the bearings are lubricated for life.

Adoption of stainless steel for the shaft permits elimination of shaft sleeves. Reducing the length between bearings results in a stiffer shaft to take care of any hydraulic disturbances. Shaft is extended on both ends to allow the finished pump to be used for either clockwise or counter clockwise rotation.

The impeller, of bronze, is cast by an advanced method to insure accuracy of dimensions and smoothness of inside and outside surfaces. This impeller is shrunk and keyed to the shaft.

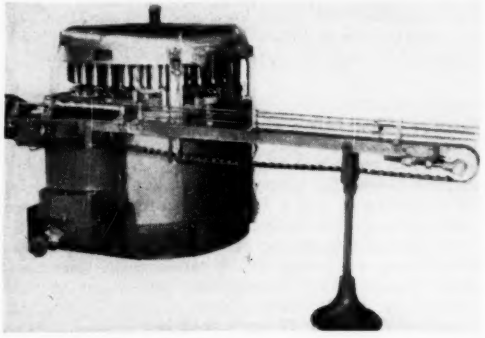
End covers are constructed so that they (1) act as a flow-smoothing guide for the liquid pumped to the impeller; (2) enclose and support the mechanical seal; (3) house the bearings.

New pump is specifically designed for a special service and exchange plan. New rotors are available for immediate shipment from factory stock. The old one is returned and credit given for all serviceable parts.

Pump is built in three sizes for capacities to 450 gpm., heads to 230 ft.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Want More Information?

It's free—and easy to get. Say for example, you want added details on the item marked "B" here on page 94. Just turn to one of the special Reader Service postcards inside the front cover and circle the 94B. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.



Accurately Fills 500 Jars Per Min. B

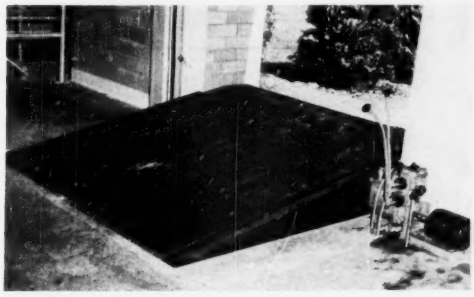
Here is a new high-speed 30-pocket plunger-type filler reported to maintain accuracy of fill at a rate of 500 jars a minute.

Accuracy of fill is stated to be plus or minus 0.05 oz. (0.6 percent) on 8-oz. jars. Top speed per minute is estimated at 650 5-oz. jars and 550 8-oz. jars. Actual tests

at speeds higher than 500 await further modifications on the line.

To convert to a new jar size, only the change of one part and a few adjustments are necessary. All contact parts are made of non-corrosive alloy, and they are easily removed for cleaning. Cone-center filler bowl speeds throughput, minimizes product separation. The machine is equipped with an electrically operated no-can-no-fill mechanism.

This machine has already seen several months' operation at the Beech-Nut baby food plant at Canajoharie, N. Y. Though primarily designed for this type of food, it is adaptable to many other products normally handled in plunger-type fillers.—*Food Machinery & Chemical Corp., Hoopeston, Ill.*



Dock Board Has Three-Way Shift A

Vertical, horizontal and lateral movement can be made with this unique cock board.

The new movable platform has a unit range of 24 in. vertical, 14 to 24 in. horizontal, and 4 in. lateral. Main motive power is developed from two fully hydraulic cylinders, one for vertical, the other for horizontal. Lateral movement is supplied by a flexible channel-ramp construction.

Illustration shows dock extended horizontally and at extreme top of vertical rise. It is operated by manual lever control mounted on pump, in complete view of board. Push-button control with solnoid action can be furnished. In this installation, the pump may be concealed under the board.—*Beacon Experimental & Engineering Co., 714 No. 13th St., St. Louis 3, Mo.*

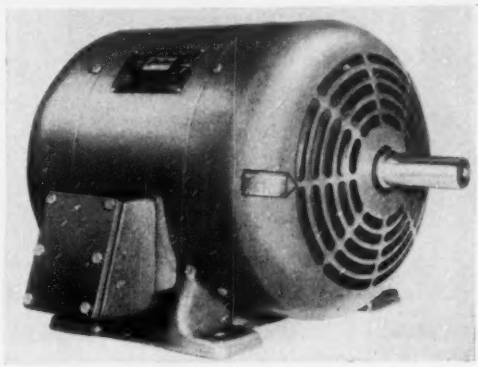
Rotator Thoroughly Mixes Sodas B

A machine which thoroughly mixes the flavoring syrup and carbonated water in beverages after bottling has recently been perfected.

The unit consists of a drum rotating slowly (11 rpm.) on an axis at right angles to the travel of the bottles from the filling and capping machines. Attached to the drum are six compartments into which the bottles are pushed by the travel of the conveyor from the capping machine.

Bottles rotate in the compartments with the drum until discharged. Each compartment holds from three to six bottles, depending on the bottle size. As each bottle enters the mixer it forces a completely mixed bottle out of the compartment on the opposite side and on to a conveyor feeding the inspection and casing departments.

The drum of the mixing machine is driven by a separate ½ hp. motor through a wood-against-metal friction clutch. There is special adjustment on the clutch, so that if any bottle does not enter or leave the compartment with complete clearance, the drum slips on the clutch without breakage of the bottle.—*Keenline Equipment Co., Oshkosh, Wis.*



Motors Resist Fumes, Liquids C

For applications where corrosive fumes and liquids are encountered, the new Type CSP Life-Line motors have been especially designed.

These motors use bronze split-hub, clamp-type blowers for corrosion resistance. Rotating Neoprene slingers on the shafts between rear brackets and hoods are used to prevent the entrance of dirt or liquids into the bearing housings. Stator windings are double-dipped and baked in thermoset varnish. All hardware is dipped in slushing compound prior to assembly. The gasket conduit box can be rotated to meet installation requirements.

In fabrication, the frames, brackets, hoods, and other exposed parts, are alkali-cleaned, hot-water rinsed, then rinsed in chromic acid spray. After drying, they are sprayed with phenolic-alkyd-type enamel and baked. Additional protection is provided by a coat of gray enamel and two to four dip-bakes of thermoset varnish, followed by a final coat of gray lacquer.

Factory-sealed prelubricated bearings are used. No lubing is needed for the life of the bearings.—*Westinghouse Electric Corp., P. O. Box* 2099, *Pittsburgh* 30.

DON'T MISS THESE . . .

Bun molder uses "Teflon" plastic sheeting rolls. They require no dusting.....Page 96

Magnetic separator removes tramp iron from materials flowing in round pipes.....Page 98

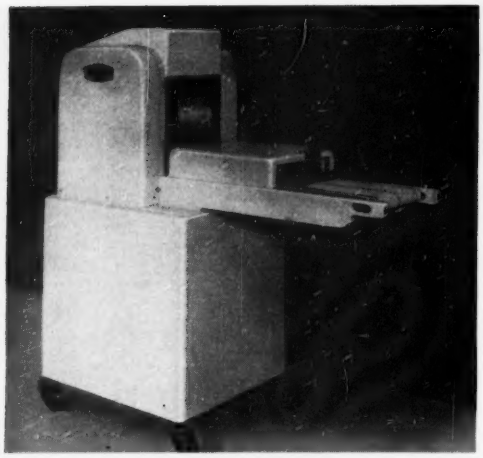
Water flow operates control device by opening and closing electrical contacts.....Page 99

Treatment time short in evaporator concentrating heat-sensitive materials.....Page 100

AND WATCH FOR . . .

Automatic unit which packs edible meat trimmings in multi-wall paper valve-type bags.....In Oct. FI

New cherry pitter, utilizing rubber cups, makes neater holes, cuts waste.....In Oct. FI



Bun Molder Uses New Plastic A

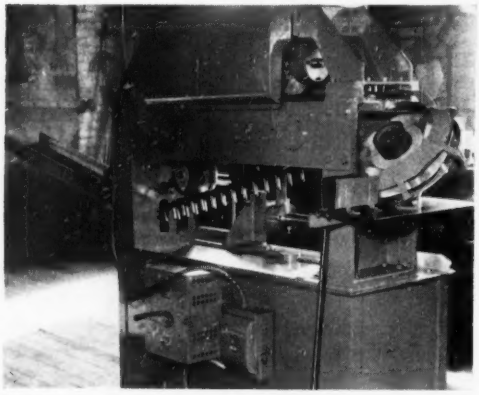
For the production of frankfurter and other elongated buns or rolls, a new molding machine has been announced.

This unit, equipped with Teflon sheeting rolls, is claimed to require no dusting flour for the sheeting operation. The rolls also are stated to eliminate need for scrapers, and are reported to permit thinner sheeting of the dough piece.

Designed to take the maximum output of roll sealing machines, the molder is equipped with variable-speed drive for synchronization with them. Speeds range from 40 to 260 per min.

A plate is available to adapt the molder into a roll flattening device for hamburger buns. Machine is equipped with three former plates for various lengths and shapes of rolls. The standard commercial lengths can be molded.

Cutting blades are available for cloverleaf, parker house, and cut-end dinner rolls.—*Read Machinery Div., The Standard Stoker Co., Inc., York, Pa.*



Machine Brush-Dries Bottles B

Any drippings or dampness remaining on bottles leaving the filling operation are removed automatically by a brushing and polishing machine recently developed.

In operation, bottles are fed, in a horizontal position, via the inclined tray (left) of the machine. They are then picked up automatically by pins on a chain conveyor and carried into the machine.

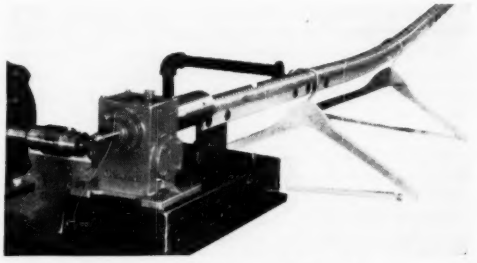
As the bottles are getting their brushing they are rotating continuously. The large upper brush, turning at 1,800 rpm., passes twice back and forth over each bottle and follows its contour. A second brush on the machine is used to clean and polish the bottoms of the bottles.

Finally, the bottles are picked up by a turret (right) and turned to a vertical position preparatory for conveying to the next processing stage.

Average machine speed is 60 bottles per minute with a maximum of 75. The rate may be varied while the machine is in operation to suit the timing of the line operations.—*Mantle & Co., 1907 Park Ave., New York City 35.*

Determines Concentration Ratio Fast C

Calculations in citrus-juice concentration, blending, and dilution are simplified by this handy slide rule. A simple setting of slide will show relationship of deg. Brix of juice, deg. Brix of Concentrate, and concentration ratio. Reverse side carries a pair of scales to correct refractometer sugar values of citrus juices to deg. Brix.—*Bireley's Div., General Food Corp., Hollywood 38, Calif.*



Unit Carries Loads Around Bends D

Light loads can be carried around curves and up or down inclines by this light weight conveyor that employs a new principle in conveying. Apart from the drive there is only one moving part.

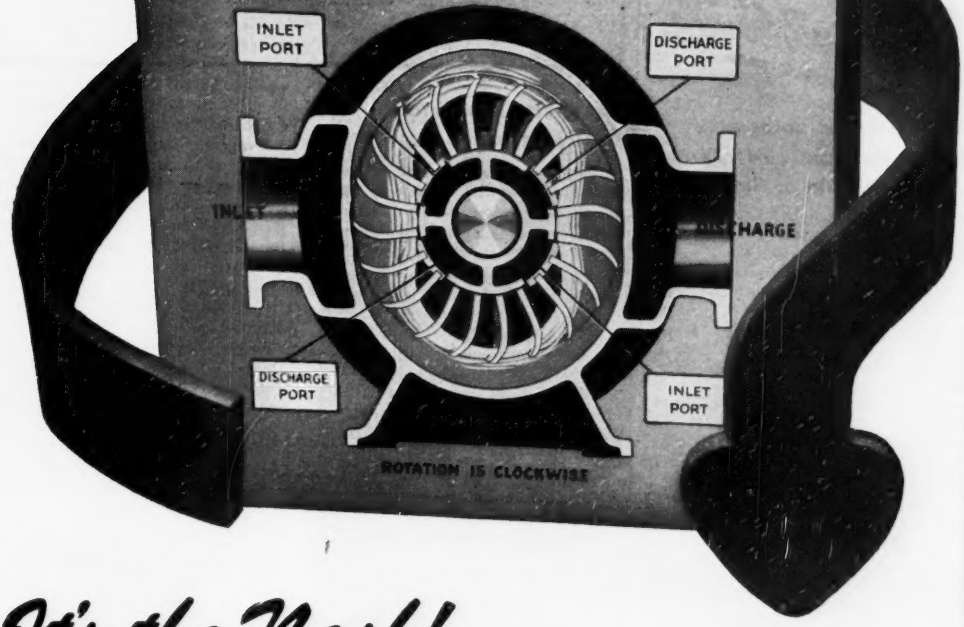
Unit consists of two principal components—a patented Teleflex cable, and a special metal rail. Since the cable features a spiral thread on its exterior, the effect is that of a flexible screw, of any desired length. The helix or thread of the cable extends above the rail section and the cable is revolved within the rail.

Items to be transported are suspended from hooks that ride on the rail (see illustration showing coat hangers as an example). The hook-carried goods are moved along by the screw action of the turning cable. Top speed is 12 fpm.

Maximum load to be transported is 15 lb. per ft. Minimum bend radius is 4 ft. Maximum length for each unit conveyor with two 90 deg. bends (or equivalent) is 150 ft.

Conveyor is driven by ½ hp. variable speed motor.—*Teleflex Inc., P. O. Box 4408 Nicetown, Philadelphia 40.*

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

31 WILSON, SO. NORWALK, CONN.

Tough yet Gentle

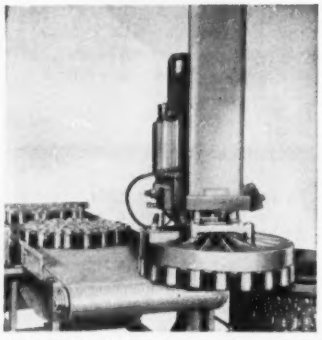
Cambridge WIRE BELTS

Combine Movement with Processing Through Fire or Water

Cambridge Wire Belts shrug off extremes of temperatures, corrosive agents, torsion, strain and wear. They hustle rough, bulky objects through the most rigorous treating processes, or convey delicate products with maximum safety.

Tempering, quenching, washing, baking, sizing, sorting, packaging, glazing; throughout industry, Cambridge Wire Belts are working at nearly every bulk material processing job. Each of these Cambridge Belts is fabricated in the proper mesh, weave, metal or alloy to do the job better, faster, safer and more economically.

Let a Cambridge Field Engineer help you secure these advantages for your operation.



A Cambridge "Gratex" Wire Belt conveying baby food jars to a W. F. & John Barnes Junior Hydro-Magnetic Crate Loader and Unloader. The small-bottomed jars won't tip or trip when shuffled on this closely-woven belt.

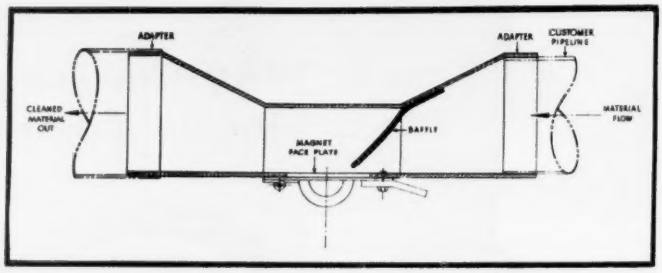
Write for FREE copy of the 130-page, illustrated Cambridge Wire Belt Catalog. It's an education in belt and conveyor design, application, installation and operation.

Cambridge Wire Cloth Co.

Dept. Q • Cambridge 9, Md.

Wire cloth in rolls. Also specialized wire fabrications

OFFICES IN PRINCIPAL INDUSTRIAL CITIES



Magnetic Separator Easily Installed A

For economical removal of tramp iron from material flowing in round, gravity flow pipes, a new permanent (non-electric) magnetic separator is announced. With special adaptor for simple installation, unit is reported to provide high separation efficiency.

Installation only requires cutting out a small section of the pipe where the magnetic protection is desired. At the inlet side, the adaptor fits over the outside diameter of the pipe; at the outlet side it fits inside. This eliminates fittings and gaskets, and there is no leakage.

Once set up, unit offers maximum protection, states maker, because material being cleaned passes directly over face plate of magnet.—*Eriez Mfg. Co., Erie, Pa.*

Stainless Steel Drums That Handle Easily B

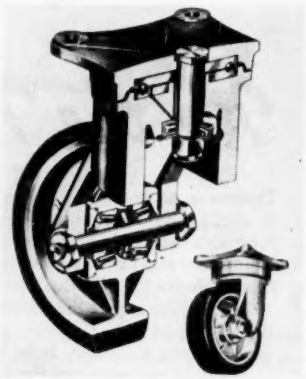
For use with food syrups and flavors, oils, extracts and liquid chemicals, a new all stainless steel container has been developed. Made of Armco Type 304 stainless steel, it is strong, long lasting, readily cleaned, and easy to handle.

Known as the Lee stainless container, it has a capacity of 15 gal., yet weighs only 27 lb. It is designed for rough handling.

Depressed hand holds in the top chime (see photo) along with the light weight makes for the easy handling. Chimes are designed for solid, but easy, stacking, with resultant space saving in the warehouse and in shipping. Container cap, of a new double construction, is provided with wrench fittings, and is permanently chained to the container.

Name identifications may be stamped, as shown, on the top chime. Spherical bottom permits complete draining of entire contents even by siphoning.

Units are of welded all stainless steel construction.—*Steel Cooperage Co., Div. of Industrial Stamping & Mfg. Co.,* 4801 *Bellevue Ave., Detroit 7.*



Trailer Wheels, Casters Made of Aluminum C

Developed primarily for use on power towed equipment is a new line of heavy duty industrial trailer wheels and casters.

Available in both rigid and swivel casters, they are cast of prime aluminum alloy and specially constructed to reduce clutch wear, battery strain, and mechanical fatigue on power towing equipment.

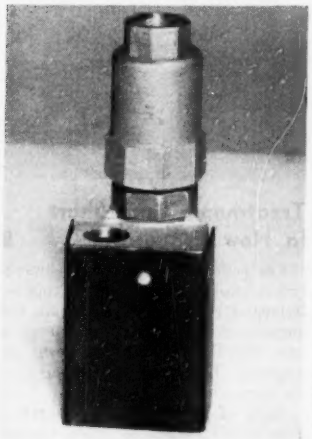
Other features include sensitive swiveling action; lifetime, sealed-in lubrication; and a permanently ad-

justed kingpin of 1¼-in. chrome-moly steel.

The wheel is designed to feature a more practical tread contour and shore hardness to ensure minimum rubber displacement under load. Tread will not chip, gouge, or adopt a permanent set.

Like the caster, the heavy duty industrial wheels are permanently sealed and lubricated. Condensation will not form in the wheel hubs or swivel caster rigs, nor will steam under pressure or developed vacuum disturb or destroy the sealing features. Grease fittings are not required.

Timken or Bower automotive standard tapered roller bearings of the largest possible size in relation to the specified wheel diameter are used to provide easier starting and smoother rolling.—*Aerol Co., Inc., 2820 Ontario St., Burbank, Calif.*



Water Flow Operates Electrical Control

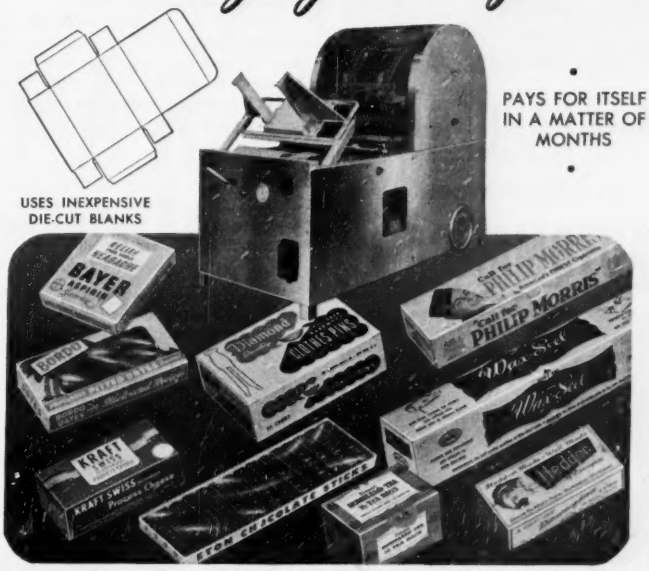
Electrical contacts are opened or closed by a new control device which responds to a flow of cold water.

Called a flow interlock, the device measures approximately 2½ x 3 x 7 in. In operation, it closes a contact when a flow of water exceeds a pre-set amount and opens it when the flow falls below. The device actually acts as a fuse in a circuit which depends upon water cooling for protection.

According to the manufacturer; the unit can be used as a safety device in many other applications where it is desirable to actuate an electrical contact with a flow of water.

Adjustment can be made to control the circuit for any flow from 1 to 4 gal. per min. Flow differential between cut-in and cut-out of the electrical contact is 0.2 gal. minimum and

Make your own CARTONS at amazing Savings!



Carton blanks, erected and sealed at high speed by the Palmer *Continuous Motion* Carton Former, make astonishing savings over the cost of buying set-up cartons. . . . Savings on material costs alone often pay for the machine in a matter of months!

And even where cartons are set up by hand or formed by a conventional type machine, the Palmer makes important savings.

So no matter what method you are using, it will pay you to check on the Palmer.

Due to advanced engineering design, the Palmer operates on the principle of *continuous motion*—which results in greater speed (up to 102 per minute) and smoother, uninterrupted production. Blanks are fed in lots of 500 to 1000 at a time; the machine does not have to be stopped to insert a new supply. It can be adjusted for a different size more easily than any other machine of its kind. And it can be adapted to a wide variety of carton styles.

Write for literature giving full information

PALMER *Continuous Motion* CARTON FORMER

PACKAGE MACHINERY COMPANY • PALMER DIVISION
Springfield, Massachusetts

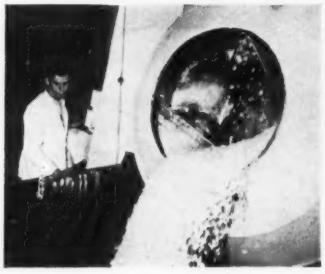
NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

PACKAGE MACHINERY COMPANY

Handle LARGER Batches

. . . Discharge

AUTOMATICALLY



Now you can do more mixing in less time—with the Worthington-Ransome Rotating-Tilting Pan-Type Mixer.

The drum is not only motor-*rotated* . . . it's also motor-*tilted*. Push-button tilts drum to any angle while rotating —materials discharge *completely*, with no nuisance of scooping.

Capacities up to 3000 lb. reduce handling and re-handling and increase output.

Widely used for coating, coloring, tumbling, polishing and finishing on candies, gum, drug tablets, etc.—mixing powdered milk, relishes, dry gelatin, etc.

Write for Bulletin R-708 on Worthington-Ransome Mixers, built from designs developed from nearly a century of mixer experience.

WORTHINGTON

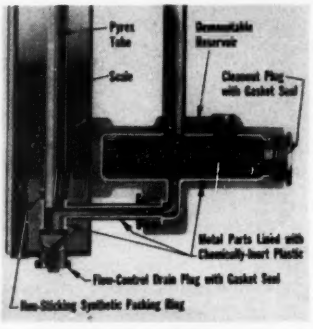
WORTHINGTON PUMP AND MACHINERY CORP.
RANSOME INDUSTRIAL MIXER DIVISION
DUNELLEN, NEW JERSEY YR.O.4

0.4 gal. maximum. The interlock does not control the amount of water flow, but this can be accomplished, it is said, by installing a throttling or regulating valve ahead of the device.

Interlock mechanism is available complete with union fitting and strainer attachment. Strainer keeps foreign matter out of the housing, while the union fitting enables easy installation into a line and facilitates removal of the unit for repairs or for stainer cleaning purposes.

Designed to operate for the amount of flow independent of pressure, the unit is intended only for cold-water applications. For use with other fluids it is recommended that the maker be contacted for more detailed information.

Electrical rating of the device is 10 amp, at 125v., 5 amp. at 250v., and 3 amp. at 460v., all a.c. Maximum line pressure that the flow interlock will withstand is 125 lb. per sq. in.—*General Electric Co., Schenectady 5, N. Y.*



Cleanout Simplified In New Manometers A

Minimum mercury contamination and easier cleanout are among the features reported for a new line of reservoir-type manometers.

To prevent contamination of the indicating liquid, drain and cleanout plugs are straight-threaded and gasket-sealed, eliminating use of sealing compound on all threads below surface of the liquid.

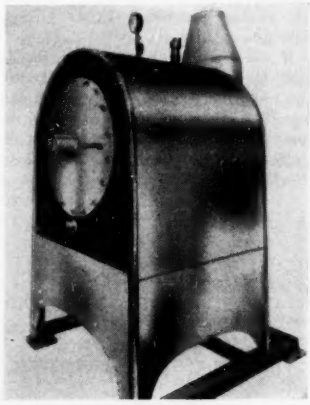
In addition, reservoir and metal passages are lined with a new insoluble thermosetting plastic, highly resistant to acids, alkalis, and thinners.

This lining, nearly glass-hard, protects the mercury from contact with metal, reduces oxidation to a minimum, and eliminates much of the need for frequent cleaning.

Drain plug releases liquid through hole in its center, and it prevents liquid from splashing or from spreading over the bottom of manometer.

In the rear of the reservoir, a plugged opening provides easy cleanout and facilitates removal of gummy deposits. For cleaning the connecting tube the reservoir is demountable.

Manometers of this design are regularly available in 14 lengths with scales from 12 to 116-in. long, for use on line pressures up to 200 psi.—*King Engineering Corp., Box 100, Ann Arbor, Mich.*



Treatment Time Short In New Evaporator B

For continuous non-fouling evaporation, rapid concentration of thin solutions of heat-sensitive materials, and augmented concentration of syrups, a new stabilizing unit has been announced. Labor saving is reported in its operation.

Body of the evaporator features a code-welded insulated steel jacket. The inner wall is a horizontal cylinder, against which a rotor arm is carried on a centrally located shaft, driven at low speed. Operating steam pressure may be from 75 to 100 psig.

Thin material is delivered through a feed pipe at one end of the cylinder, and a discharge pipe removes the concentrate at the opposite end, while vapor leaves through a stack. Action of the patented rotor forces the liquid to present a very large surface area for heating and vapor release.

The short treatment time—a matter of minutes—permits retention, without damage, of the heat-sensitive components of materials being handled.

Requiring only a limited floor area, the unit is available in six sizes, affording evaporation rates from 600 to 12,000 lb. per hr. Buyer may have mild steel, copper-bearing steel, or stainless steel at all liquid contact points.—*Bowen Engineering, Inc., 20 Station Ave., North Branch, N. J.*

PATAPAR

is custom-tailored to fit your needs...

Need a paper that's strong when wet? Patapar Vegetable Parchment gives it to you. Want a paper that resists grease? Patapar is your answer. Want package sales appeal? A colorfully printed Patapar wrapper really sparkles.

Patapar is produced in 179 types. Each type is "custom-tailored" to meet special needs. Types vary as to wet-strength, grease-proofness, opaqueness, moisture vapor resistance, pliability, thickness and many other qualities.

Tell us your requirements. We will recommend the type of Patapar best suited to meet them.

BEST PAPER FOR:

Butter wrappers
Ham boiler liners
Deep freeze wraps
Can liners • Fish wrappers
Cheese wrappers
Margarine wrappers
Milk and cream can gaskets
Bacon wrappers
Vegetable wraps
and many other uses

Patapar is furnished plain or beautifully printed in one or more colors

Patapar
HI-WET-STRENGTH
GREASE-RESISTING PARCHMENT

Protected by Patapar Vegetable Parchment

Patapar Keymark, nationally advertised symbol of wrapper protection

PATERSON PARCHMENT PAPER COMPANY • BRISTOL, PENNSYLVANIA
Headquarters for Vegetable Parchment since 1885
West Coast Plant: 340 Bryant Street, San Francisco 7, California
Sales Offices: 122 E. 42nd Street, New York 17, N. Y. • 111 W. Washington St., Chicago 2, Ill.

The Story of an Unhappy Company President

(with a happy ending)

Once upon a time there was a Company President.

He had a nice little organization that did a couple of million bucks worth of business a year. Or used to. But things were getting tough. He was having trouble making deliveries on schedule. What's more, profits were getting smaller and smaller each month.

And the stockholders were all upset. No dividends.

The Company President was getting unhappier and unhappier. Finally he got mad. "I'm going to find out what in the blank blank is wrong with this blank blank place right now!" he yelled to himself. (Practically scared his secretary to death!)

So, he started through the plant. He saw men lifting big boxes and heavy cartons. He saw how slowly highway trucks and railroad cars were being unloaded. He saw wasted time where the production line was waiting for materials.

Boy, if *that* didn't start him thinking, though! He rushed back into his office and phoned a battery-electric truck salesman who had been recommending trucks for umpteen years. "Come on over here right now and help me straighten out this blank blank situation!" bellowed the Company President.

Quick as a wink, that truck salesman was there, and together they went through the plant. The salesman showed the Company President how battery-electric trucks would save time, cut out delays, make work easier for the employees, and save money in the long run.

He told the Company President how clean the trucks were, no fumes, no dirt; how dependable they were, a minimum of maintenance, low-cost operation; how safe they were, how easy to operate.

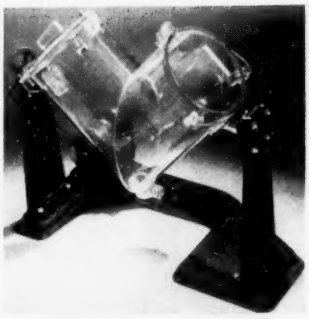
Well, the company bought four trucks. Everything the salesman promised came true. The Company President got very happy. Business picked up. Orders were delivered on time. Profits climbed. The stockholders at the next Annual Meeting

elected the Company President Chairman of the Board, too! And they all lived happily ever after.

Have YOU taken a good look at your material-handling situation lately? Is it in blank blank shape? Are you unhappy? Our new "Handbook of Material Handling with Industrial Trucks" will help solve your blank blank problems. It costs $1, but responsible company officials will get a copy *free* by writing us a request on company stationery.

The Electric Industrial Truck Association

3701-G NORTH BROAD STREET • PHILADELPHIA 40, PENNSYLVANIA



See What Happens A

Mixing of dry-solids can be observed in this laboratory Plexiglas twin-shell blender. It is available in 4 and 8 qt. barrel sizes and is rotated at 32 rpm. by chain and sprocket drive from a gearhead motor.—*The Patterson Kelley Co., Inc., East Stroudsburg, Pa.*

Equipment Briefs

Portable Propeller Mixers B

Special light and sturdy construction, also a continuous-duty industrial type motor are featured in a newly designed portable propeller-type power mixer. Propellers and shaft are stainless steel. Direct drive and geared type are available in ¼, ½, and ¾ hp. sizes.—*The Patterson Foundry & Machine Co., East Liverpool, Ohio.*

Stainless Steel Sponge C

Food processing equipment is reported quickly and easily scoured without scratching with Superior stainless steel sponge. Termed flexible and gentle on the hands, sponge is easily flushed and cleaned. It can be used with detergents, soaps, and cleaning compounds.—*F. H. Langsenkamp Co., 227-235 East South St., Indianapolis, Ind.*

Improved Rubber Gloves D

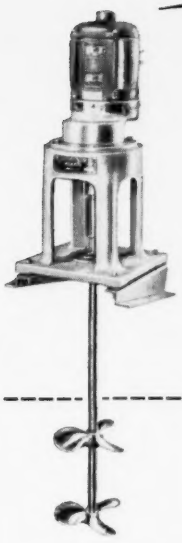
New industrial rubber gloves, called "Griprite", made with a roughened surface, are stated to insure a firm, tight hold even in the wettest applications, allowing work under these conditions to be accomplished with greater ease and speed. Gloves are designed to enable wearer to grasp smallest objects firmly.—*The B. F. Goodrich Co., Akron, Ohio.*

Centrifugal Pumps E

Design of new centrifugal pumps permits fitting them on any motor which has NEMA Type "C" mounting flange. Capacities range up to 200 gpm., heads up to 165 ft. Motors are ¼ to 7½ hp., and speeds are 1,750 and 3,500 rpm.—*The Deming Co., Salem, Ohio.*

Correction

In the item "Dries Delicate Materials" appearing in this department in July FI, page 92, credit for the development described was mistakenly assigned to "Deep Freeze Corp." Correct name of the organization is Dry Freeze Corp., address of which is 616 W. Washington Blvd., Chicago 6, Ill.



Lightnin® Mixers

(MIXCO® Engineered)

can cut your ice-making costs too!

- Better Ice Yield
- No "Cupping" of Cakes
- Less Refrigeration Used
- Lower Upkeep Cost

This LIGHTNIN Mixer delivers real savings on ice production at Brockport Cold Storage Co., Brockport, N. Y.

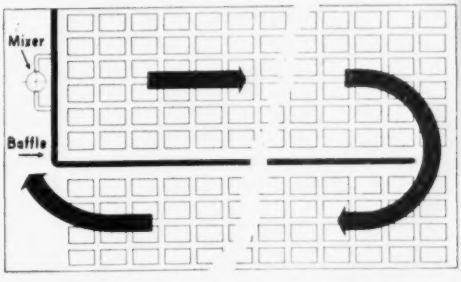
Formerly, losses up to 25% resulted from incomplete freezing of cans, due to poor circulation of brine around the edges of the layout.

With the new LIGHTNIN Mixer, every 325-pound can freezes right to the top. Better circulation means less refrigeration is used to freeze the same tonnage of ice—a daily saving on power. Also, mixer horsepower has been reduced to 2 HP, as compared to 3 HP on equipment formerly used. And LIGHTNIN construction eliminates the need for a steady bearing and an immersed stuffing box, both of which had required frequent servicing.

Needless to say, the customer is pleased with his new LIGHTNIN, a gear drive fixed-mounting unit that runs 24 hours a day and will require change of gear lubricant only once a year.

Whether your problem is circulation, mixing, blending, stirring, or any other type of fluid agitation, Mixco engineers will be glad to help you get better results, too. Write today for full details.

EVERY ICE CAN freezes right up to the top. Better brine circulation by Lightnin Mixer eliminates "cupping" or incomplete freezing—boosts ice production as much as 25%.



BRINE FLOWS around ice cans at 70 FPM. Cans at edges freeze as completely as those in the center. Mixco engineers use exclusive data to figure best practical circulation for any job. Then they apply the LIGHTNIN Mixer that gives the correct flow rate.

COMPLETE MIXING SERVICE FOR FOOD INDUSTRIES

LIGHTNIN PORTABLE MIXERS
Electric or air driven; direct or gear drive. Sizes ⅛ to 3 HP.

FOR CLOSED TANKS
LIGHTNIN propeller mixers for pressure and vacuum. Sizes ¼ to 3 HP.

MIXING EQUIPMENT Co., Inc.
(MIXCO)

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MIXING EQUIPMENT Co., Inc.
1043 Garson Ave., Rochester 9, N. Y:

Please send me the catalogs checked:

- ☐ B-75: Portable Mixers (Electric and Air Driven)
- ☐ B-76: Side Entering Mixers (Propeller Type)
- ☐ B-78: Top Entering Mixers (Propeller Type)
- ☐ B-89: Top Entering Mixers (Turbine and Paddle Type)
- ☐ Mi-11: Mixing Operations Data Sheet
- ☐ DH-50: Laboratory Mixers

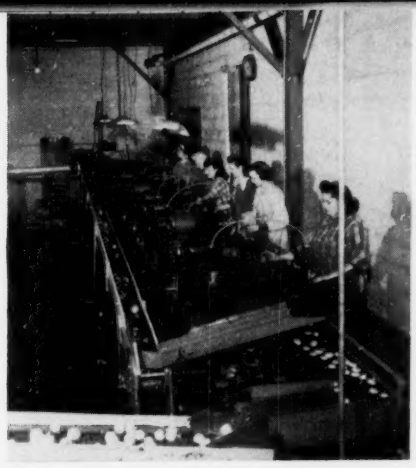
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

1 OPERATOR puts apples on peeling spindle. Machine completes the job.

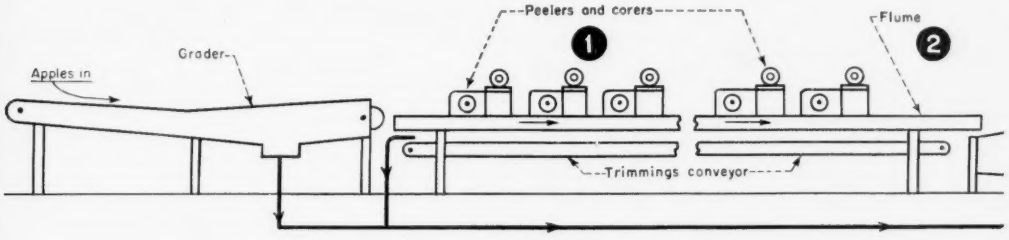


2 CORES AND PEELS fall onto belt. Peeled apples are carried in flume (lower right).

UNFOLD HERE

Quality Fruit Concentrate From Trimmings

Juice Recovered by Advanced Method . . . Sauce-Canning Leftovers Utilized



FROM THE PEELS, cores and culls of an apple sauce canning operation, a concentrated juice credited with having the full flavor and aroma of the original fruit is now being produced. This process was developed commercially in the Fischer Spiegel plant at Geneva, Ohio.

Steps in the operations are depicted in the accompanying foldout flowsheet. Keyed photos illustrate various stations in the process.

Juice for concentrating is obtained from apples too small to be peeled, plus the trimmings left over from the fruit processed into canned sauce. This material is passed through a hammer mill and the pulp is distributed on filter cloths over racks and then goes to the hydraulic press—Point (4) in diagram. The pomace is discarded.

Resulting juice is pumped through an evaporator which converts the essence to vapor. Separated from the juice, the essence-laden vapor is then condensed and concentrated in a system comprised of a fractionating column, condensers and coolers—Point (6).

Meanwhile, the essence-less juice is pumped to wood tanks, where pectinol is added to precipitate the pectin. This is done to prevent pectin deposits in the evaporator. Juice is then pumped to jacketed kettles and heated—Point (7). Filter aid is now added before the juice is passed through a plate-and-frame filter press. Resulting clarified juice is concentrated approximately 7-1 in an evaporator operated under a vacuum of 27 in. Hg.

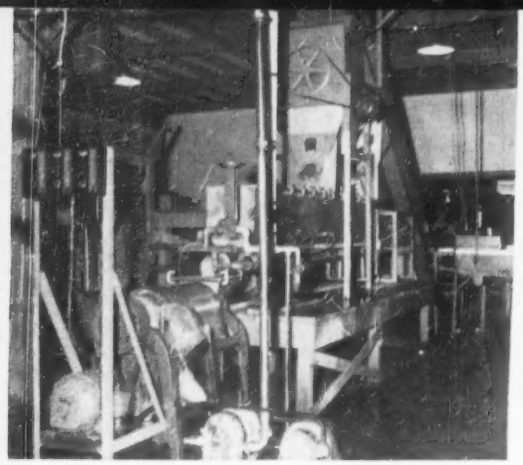
Now the concentrated essence is returned to the evaporated juice. In this manner the original fresh fruit flavor and aroma goes back into the concentrated juice.

Apples, from which the trimmings and cores are obtained, are washed and inspected after peeling, elevated to an apple chopper, and discharged into a sugar proportioner. Here, sugar is automatically added at a predetermined rate. The proportioner feeds a continous screw-conveyor type steam cooker equipped with automatic temperature controls. Sauce preparation for canning is completed in the cooker, except for a final screening in a pulper to remove any remaining seeds or seed pockets.

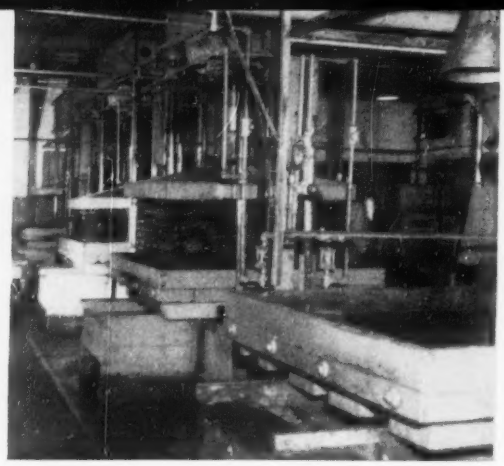
How They Came to Do It

For the full story telling why and how Fischer Spiegel switched to this new concentrating process, see the revealing special feature, "Instead of *Saving* Money They're *Making* It." You'll find it on page 81.

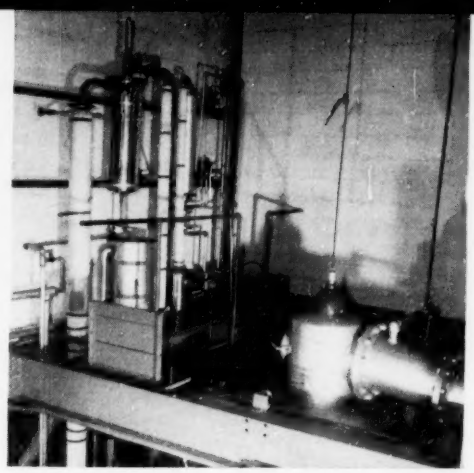
FOOD INDUSTRIES Sept. 1950 Pages 104–107



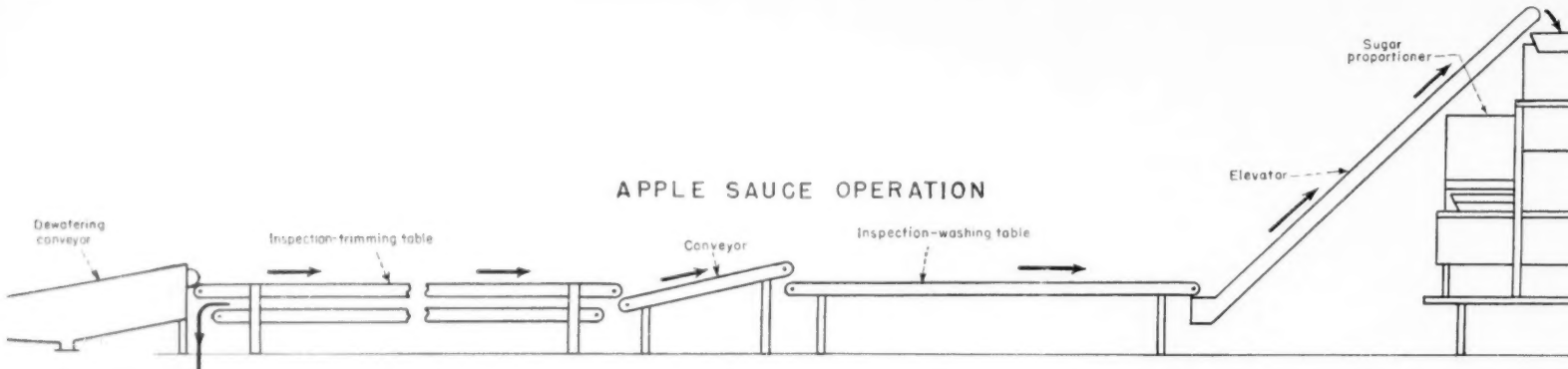
3 **MEANWHILE** apples just trimmed go to sauce process. Seen here: Cooker (center) and pulper (left front).

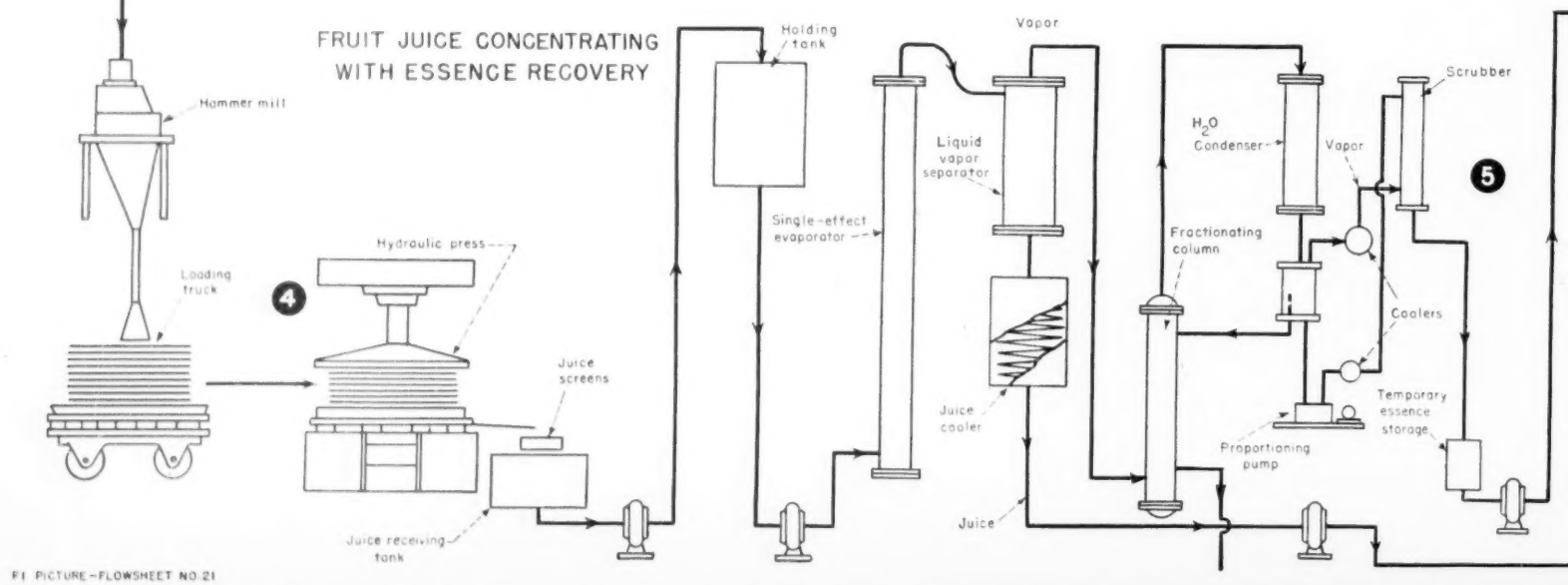


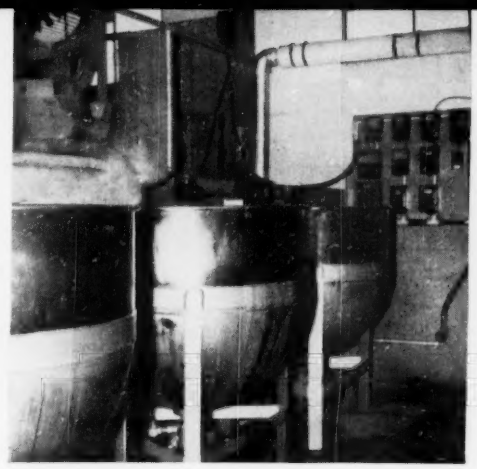
4 **JUICE** for concentrating is expressed from pulp materials on filter cloths in these hydraulic presses.



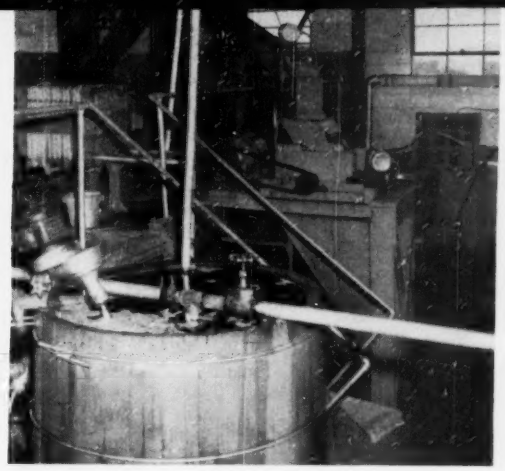
5 **ESSENCE** containing most of the aroma and flavor of juice is recovered in equipment seen at left.



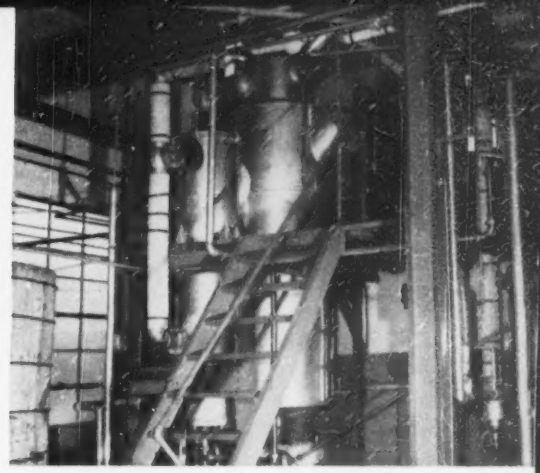




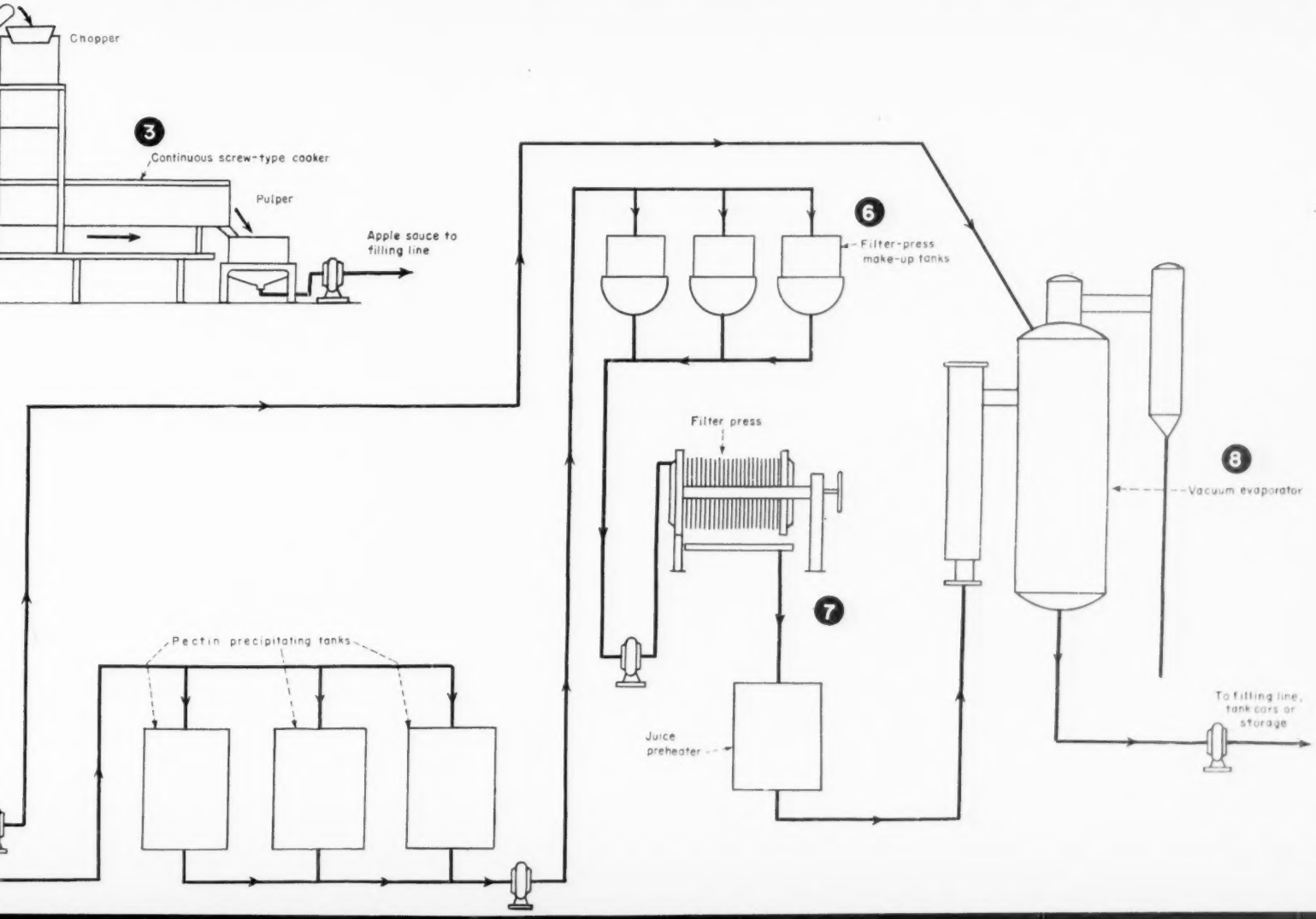
6 **FILTER AID** is added to the juice in these jacketed vessels after the pectin has been precipitated.



7 **HEATED** juice is filtered in plate-and-frame press (upper left), then goes to tank which supplies evaporator.



8 **FILTERED** juice is reduced to a concentrate in this vacuum evaporator. Essence is returned to juice after cooling.



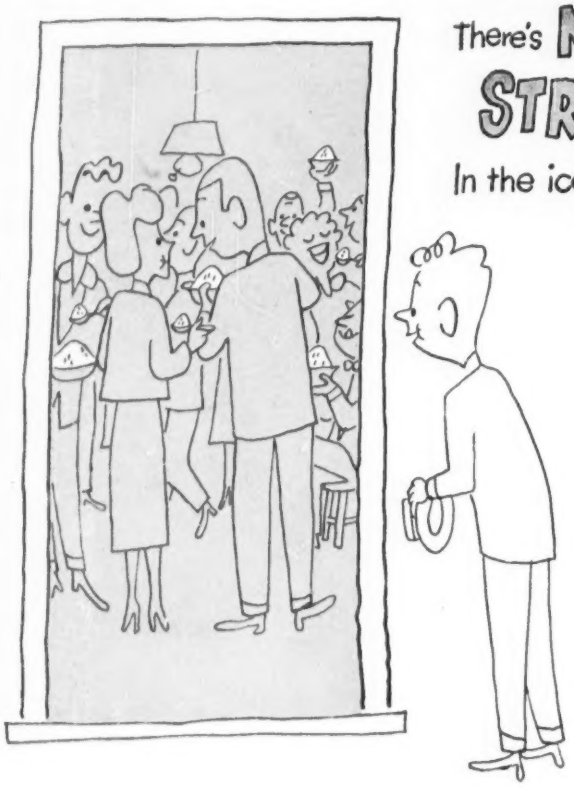
Strawberry Social here tonight!

-and of course everybody will come-

There's **NORDA STRAWBERRY** flavor

In the ice cream and cake -

TRY SOME



Good old-fashioned real strawberry flavor is a good old summertime favorite. Norda Strawberry Flavor is crammed with the true-fruit richness.

Try it. Test it. And taste it. We believe you'll agree it is good—very good. Don't you like that *more strawberry* taste?

Both Norda genuine Strawberry and fine imitation Strawberry will help you make better-tasting, *better-selling* gelatins, mixes, candies, syrups, and baked goods.

Send for *free samples* today. Ask for your Norda Flavor Catalogue, too. Come to Norda for *successful* flavors.

Norda Strawberry . . .

Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.

601 West 26th Street, New York 1, N. Y.

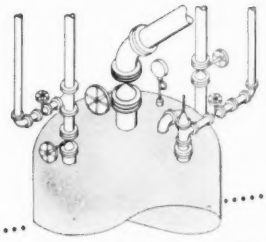
CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

BASED ON FACTS REPORTED

5 times-plus longer servic

with dependable

CRANE VALVES



PROBLEM: To find a better replacement for valves that needed repairs every 2 to 3 weeks and failed completely in 3 to 4 months.

WORKING CONDITIONS: Valve exposed constantly to hydrochloric acid vapors at 50 psi, at approximately 280° F., while controlling raw material inlet line to starch converter.

SOLUTION: Crane No. 1671 Ni-Resist Cast Iron Gate Valve with Crane 18-8 Mo Alloy trim.

RESULT: On last inspection, after 19 months' service without one single interruption, Crane Ni-Resist valves were still in very good condition.

Here's an example of the long life and low-cost maintenance that make Crane Quality the best value in all types of valv

More CRANE VALVES are used than any other

CRA

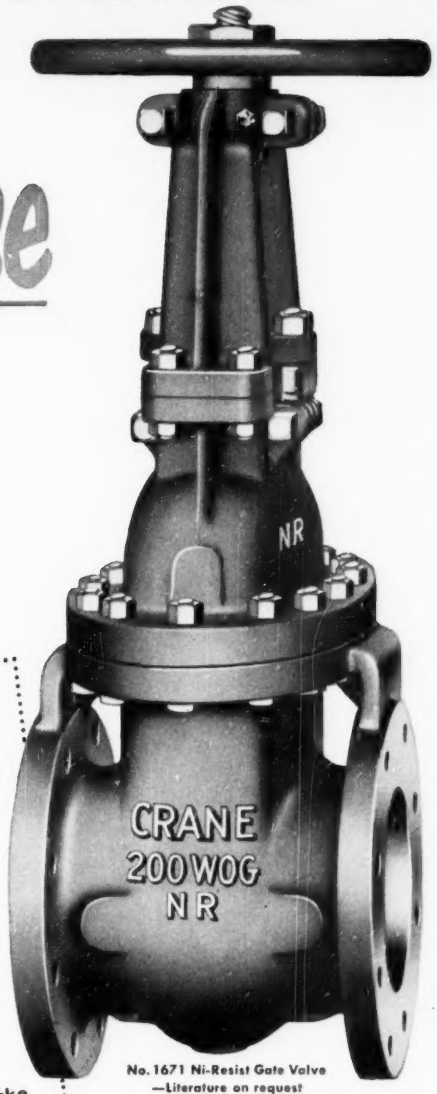
CRANE CO., *General Offices:* 836 S. M

Branches and Wholesalers Servin

VALVES • FITTINGS • PIPE

ED BY A CRANE VALVE USER

ice



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other make

No. 1671 Ni-Resist Gate Valve
—Literature on request
through your Crane Branch or
Crane Wholesaler.

ANE

S. Michigan Ave., Chicago 5, Ill.
Serving All Industrial Areas

E • PLUMBING • HEATING

You might ponder a bit about what you see in Soda Fountains

UNLIKE the bemused young man who is ruining his shoeshine, above, we ask you to overlook the social aspects of soda fountains, sandwich shops or lunch counters, etc., and give heed instead to their economics.

The economic angles, for instance, that cause these popular eating places of the short-order, quick-lunch variety to go in so heavily for stainless steel equipment. Notice it for yourself. Practically *everything* behind their counters is made of clean, bright, efficient-looking stainless steel—sometimes even the walls and ceiling.

Why? Because nothing else fills the bill as well and keeps operating costs as low. No other commercially available metal packs the same combination of great strength and resistance to corrosion, heat and wear. No other metal cleans as easily and quickly, lasts as long and stays as good-looking. *No other metal, therefore, is as cheap in the long run as stainless steel.*

Can't you find a reason there, somewhere, for turning Allegheny Metal to your own profitable use? Ask us for any help you need.

* * * * *

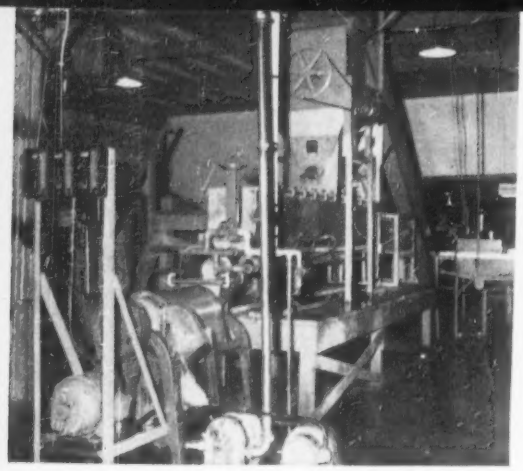
Complete technical and fabricating data—engineering help, too—are yours for the asking from Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. . . . the nation's leading producer of stainless steel in all forms. Branch Offices are located in principal cities, coast to coast, and Warehouse Stocks of Allegheny Stainless Steel are carried by all Joseph T. Ryerson & Son, Inc. plants.

W&D 3130

You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED
STAINLESS STEEL



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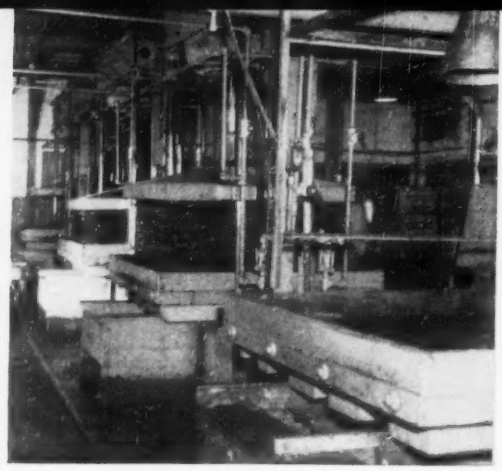

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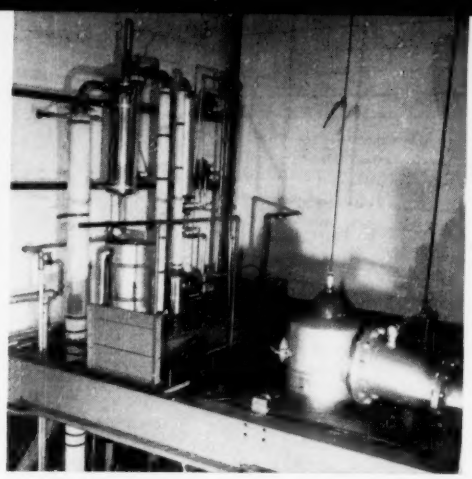
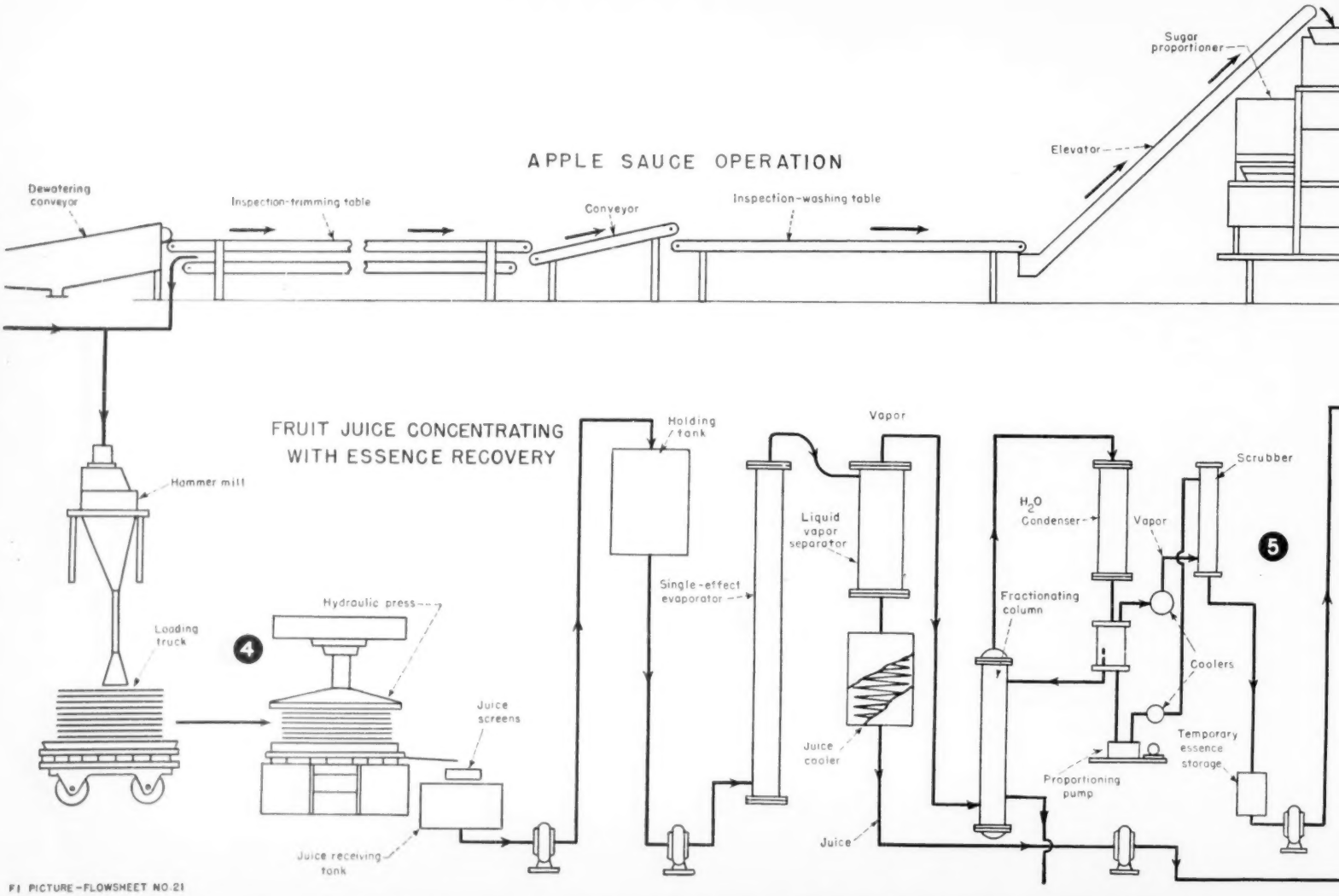
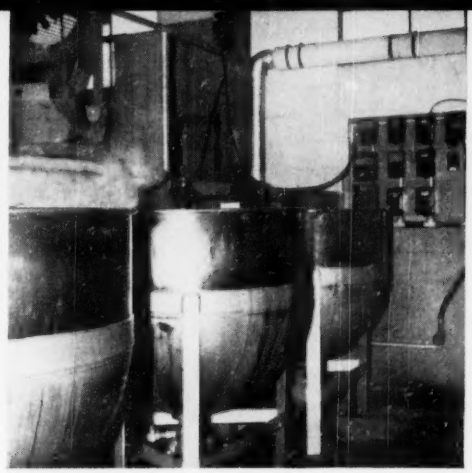


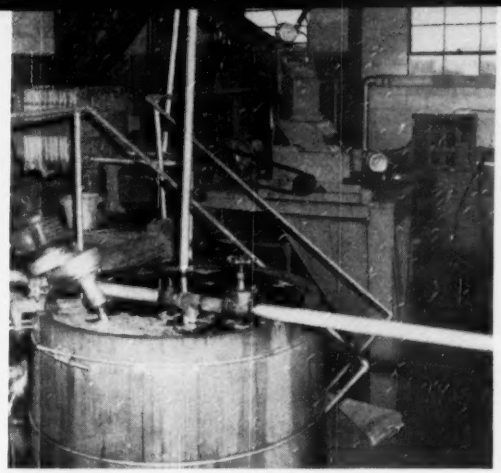
5 **ESSENCE** containing most of the aroma and flavor of juice is recovered in equipment seen at left.



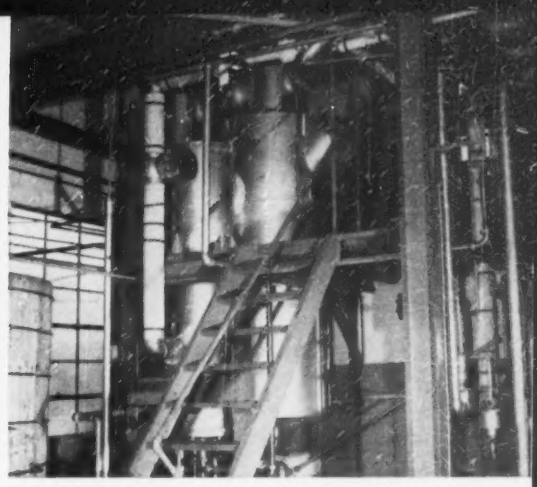
FI PICTURE-FLOWSHEET NO. 21



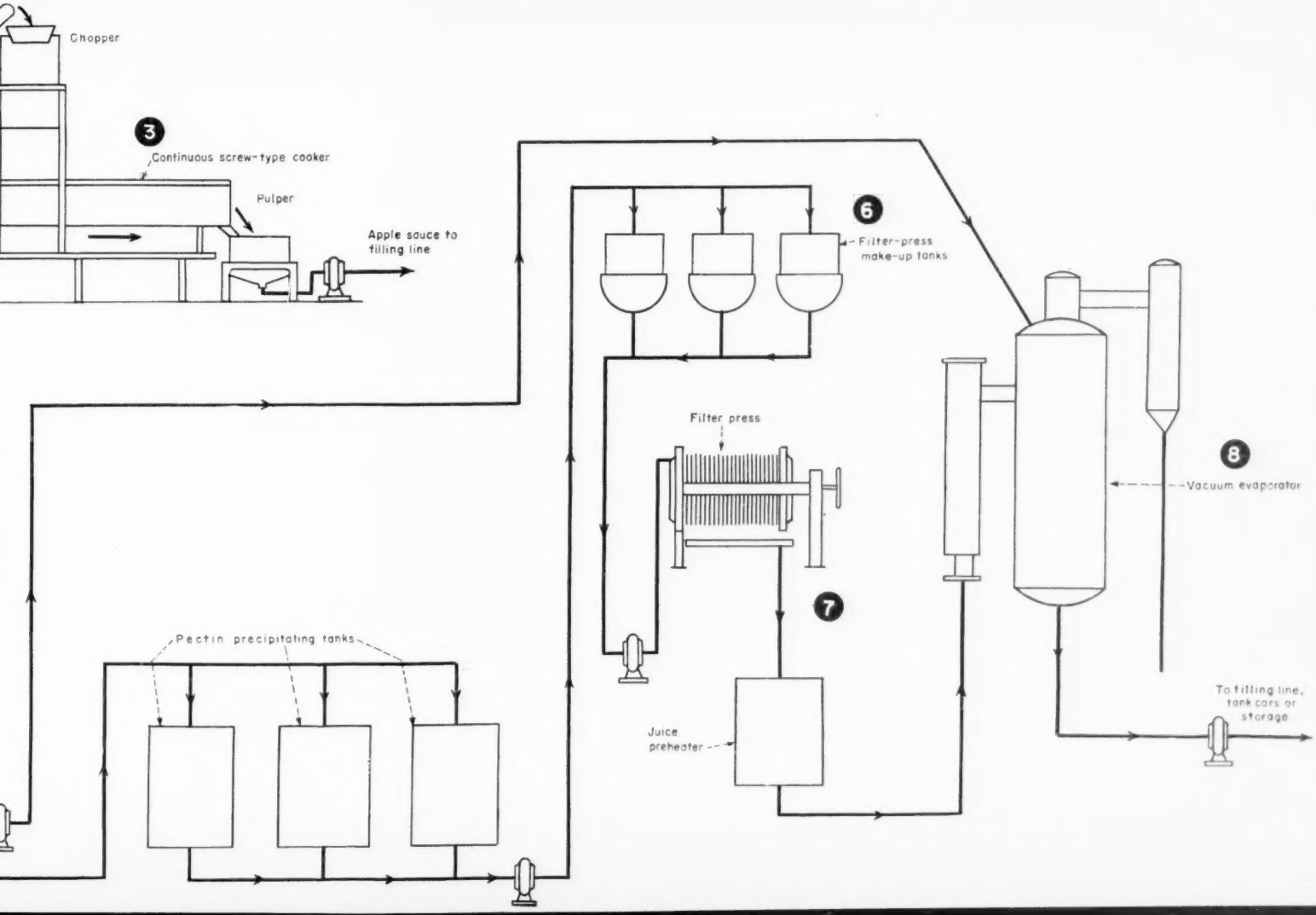
6 **FILTER AID** is added to the juice in these jacketed vessels after the pectin has been precipitated.



7 **HEATED** juice is filtered in plate-and-frame press (upper left), then goes to tank which supplies evaporator.



8 **FILTERED** juice is reduced to a concentrate in this vacuum evaporator. Essence is returned to juice after cooling.



Strawberry Social here tonight!

-and of course everybody will come-

There's NORDA STRAWBERRY flavor

In the ice cream and cake -

TRY SOME

Good old-fashioned real strawberry flavor is a good old summertime favorite. Norda Strawberry Flavor is crammed with the true-fruit richness.

Try it. Test it. And taste it. We believe you'll agree it is good—very good. Don't you like that *more strawberry* taste?

Both Norda genuine Strawberry and fine imitation Strawberry will help you make better-tasting, *better-selling* gelatins, mixes, candies, syrups, and baked goods.

Send for *free samples* today. Ask for your Norda Flavor Catalogue, too. Come to Norda for *successful* flavors.

Norda Strawberry . . .

Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.

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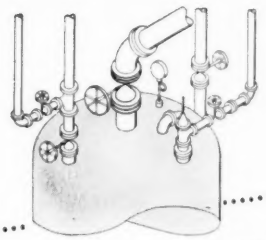
BASED ON FACTS REPORTED

5 times-plus longer servi

with dependable

CRANE VALVES



PROBLEM: To find a better replacement for valves that needed repairs every 2 to 3 weeks and failed completely in 3 to 4 months.

WORKING CONDITIONS: Valve exposed constantly to hydrochloric acid vapors at 50 psi, at approximately 280° F., while controlling raw material inlet line to starch converter.

SOLUTION: Crane No. 1671 Ni-Resist Cast Iron Gate Valve with Crane 18-8 Mo Alloy trim.

RESULT: On last inspection, after 19 months' service without one single interruption, Crane Ni-Resist valves were still in very good condition.

Here's an example of the long life and low-cost maintenance that make Crane Quality the best value in all types of valv

More CRANE VALVES are used than any other

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CRANE CO., *General Offices:* 836 S. M

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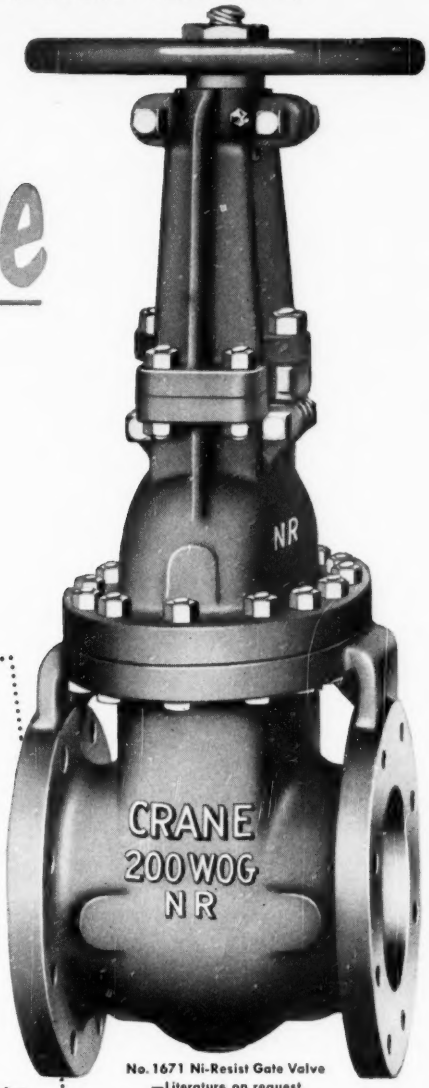
CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

VALVES • FITTINGS • PIPE •

FOOD INDUSTRIES, SEPTEMBER, 1950

ED BY A CRANE VALVE USER

vice



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Gate

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valves

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other make

No. 1671 Ni-Resist Gate Valve
—Literature on request
through your Crane Branch or
Crane Wholesaler.

ANE

6 S. Michigan Ave., Chicago 5, Ill.
Serving All Industrial Areas
E • PLUMBING • HEATING

You might ponder a bit about what you see in Soda Fountains

UNLIKE the bemused young man who is ruining his shoeshine, above, we ask you to overlook the social aspects of soda fountains, sandwich shops or lunch counters, etc., and give heed instead to their economics.

The economic angles, for instance, that cause these popular eating places of the short-order, quick-lunch variety to go in so heavily for stainless steel equipment. Notice it for yourself. Practically *everything* behind their counters is made of clean, bright, efficient-looking stainless steel—sometimes even the walls and ceiling.

Why? Because nothing else fills the bill as well and keeps operating costs as low. No other commercially available metal packs the same combination of great strength and resistance to corrosion, heat and wear. No other metal cleans as easily and quickly, lasts as long and stays as good-looking. *No other metal, therefore, is as cheap in the long run as stainless steel.*

Can't you find a reason there, somewhere, for turning Allegheny Metal to your own profitable use? Ask us for any help you need.

* * * * *

Complete technical and fabricating data—engineering help, too—are yours for the asking from Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. . . . the nation's leading producer of stainless steel in all forms. Branch Offices are located in principal cities, coast to coast, and Warehouse Stocks of Allegheny Stainless Steel are carried by all Joseph T. Ryerson & Son, Inc. plants.

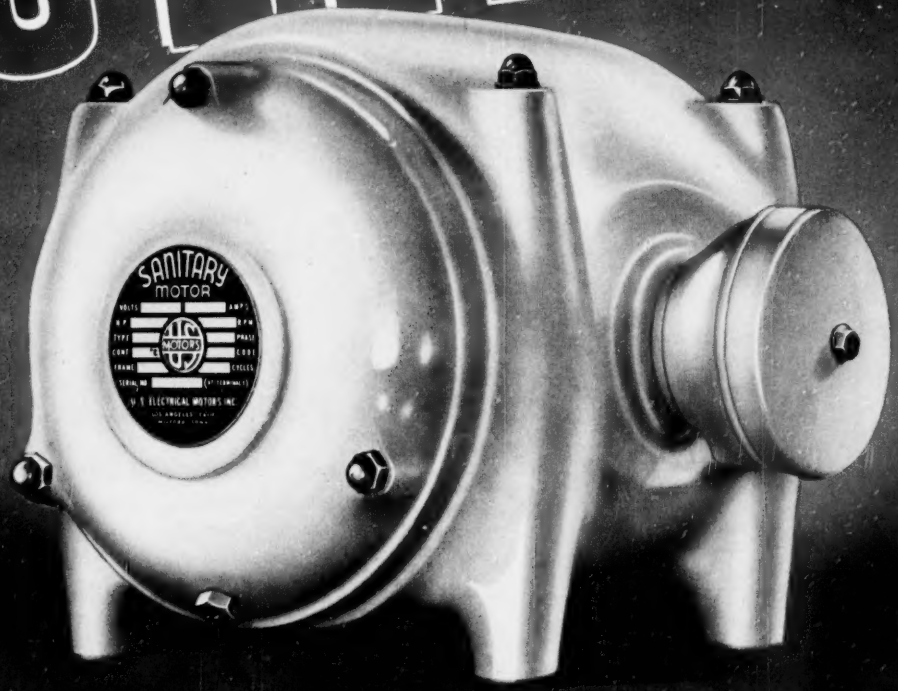
WAD 3130

You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED
STAINLESS STEEL

CLEAN

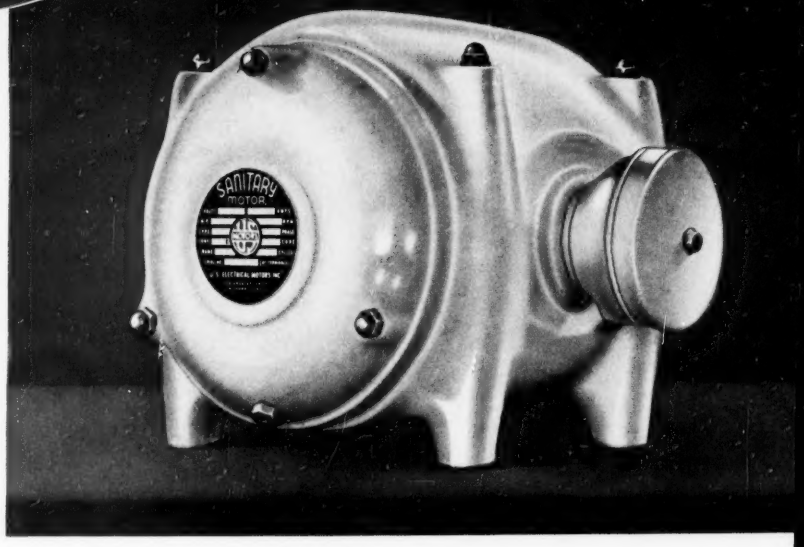


U. S. Sanitary MOTOR

(See next page)

How to inspire cleanliness in your plant

Ask for Bulletin



ADDS BEAUTY TO FINE EQUIPMENT

KEEPS CLEAN LIKE PORCELAIN

ELIMINATES MOTOR FILTH AND DRIPPING

RUNS COOL AND QUIET

INCREASES SANITATION

EASIEST TO WASH AND WIPE

SHEDS WATER LIKE A DUCK

THE *newest* LOOK IN MOTORS . . .

A totally new concept of Beauty and Sanitation

Here's the newest of motors that does more than furnish dependable power. The U. S. Sanitary Motor combines functional design with beauty of line. It inspires plant workers to keep equipment spic and span, it enhances the appearance of driven machines; it adds eye appeal and sales stimulus to machinery. The U. S. Sanitary Motor is completely housed, elegantly contoured, free from dirt-collecting crevices and pockets.

U.S. ELECTRICAL MOTORS Inc.

PACIFIC PLANT: Los Angeles 54, Calif. • ATLANTIC PLANT: Milford, Conn. — Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. *Distributors and Agents in all principal cities.*

U. S. Sanitary MOTOR

Guard Against Atmospheric Hazards...

WITH

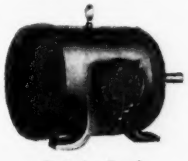
Century

PROTECTED MOTORS

Drip Proof

Splash Proof

Totally Enclosed Fan Cooled



Explosion Proof

Century C MOTORS

ALTERNATING CURRENT MOTORS

POLYPHASE

Squirrel Cage Induction—1/6 to 400 H.P.
Wound Rotor Motors—1 to 400 H.P.
Synchronous Motors—20 to 150 H.P.

SINGLE PHASE

Split Phase Induction—1/6, 1/4, 1/3 H.P.
Capacitor—1/6 to 20 H.P.
Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS

1/6 to 300 H.P.

GENERATORS

AC, .63 to 250 KVA
DC, .75 to 200 KW

GEAR MOTORS

1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

To guard your production against the destructive effects of atmospheric hazards, Century offers four types of protective motor frames.

DRIP PROOF—meets the requirements of most installations. Use it where operating conditions are relatively clean and dry. Top half of the frame is enclosed to keep out falling solids and dripping liquids.

SPLASH PROOF—keeps splashing liquids out of the motor even when the frame is washed with the full force of a hose. Use Century Splash Proof motors indoors or outdoors.

TOTALLY ENCLOSED FAN COOLED—resists the hazards of abnormal concentrations of dusts, powders, grit, oil mists, acid and alkali fumes.

EXPLOSION PROOF—protects life and property in atmospheres charged with explosive dusts or vapors.

The properly selected protection with the wide variation of starting torque characteristics to choose from provides long operating life and improves the production of the driven equipment.

Century motors are available in a wide range of kinds and types—in sizes from 1/6 to 400 horsepower—for single phase, polyphase and direct current applications.

Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO. 1806 Pine St. • St. Louis 3, Mo.
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CE-673

New Packages and Products

Kwik-chick is unbreaded, cut into 8 pieces

Flying H offers whole breaded chicken

Pre-Fried, Frozen Chicken Latest Ready-to-Eat A,B

Two versions of pre-fried, quick-frozen chicken have recently been put on the market, one in the Metropolitan New York area, the other on the Pacific Coast. Both processors apparently had the same idea in mind—that many housewives are willing to pay a bit more for select, ready-to-eat food that minimizes preparation in the home.

Although both products are fried and frozen, they differ somewhat in the processing and final form.

Kwik-chick (item A, left photo)—is not breaded. It is offered in eight pieces, packaged in a re-usable polyethylene bag placed in a waxed paperboard carton. The chicken can be served hot or cold. If wanted hot, housewife places it in preheated oven for 25 min., with no defrost.

Receiving iced whole chickens, the processor, Wading River Farms, Inc., West Hampton, N. Y., cleans, eviscerates, and cuts them into the eight pieces pictured above. These are then fried in deep fat oil at 350 deg. F. for 6 min. A minimum of flour, flavoring and salt are added, the intent being to allow consumer to season to his liking, thus keeping the possible market at a maximum.

After cooling for ½ hr., the chickens are kept in a walk-in freezer at 30 deg. F. The final packaging operation consists of hand-placing in Visqueen bags, putting in boxes, weighing, then packing six boxes in a corrugated carton. Lastly they are blast-frozen at —40 deg. F. and then await distribution to retailers.

The second fried fowl is called Flying H Ranch Frozen Fried Chicken With Gravy (Item B, right photo). It is sold whole and breaded. Before serving—either hot or cold—it is to be defrosted. Heating takes 10 min. The package features a cellophane window.

Flying H Poultry Co., Burbank, Calif., is processing this chicken under franchise from John Loos of Douglas, Ariz., developer of the special frying process.

The method is said to overcome two big problems encountered in freezing fried chicken—bleaching of the golden brown color, and excessive drying of the meat.

The Burbank plant is using standard cooking and freezing equipment, but automatic breaders and fryers are under development for use of franchise holders.

White Sauce Via a Powder C

A Canadian housewife has now perfected another time-saving white sauce base using a different approach. Mrs. F. W. Case, of Ste. Anne de Bellevue, Que., is marketing a powder with milk already incorporated. The consumer prepares her sauce by adding boiling water and stirring.

The development follows earlier introduction, in this country, of a solid bar white sauce base, conceived by a Long Island housewife (reported in Jan. FI New Packages & Products). Here, the consumer makes the sauce by adding milk, heating, and stirring.

Offered under the line-name, Lazy Susan Sauces, the new white powder is packaged in a bag featuring triple lamination (Kraft paper sandwiched between foil layers).

Ingredients are powdered milk, flour, shortening, salt and seasoning.

Want More Information?

It's free—and easy to get. Say, for instance, you want added details on the item marked "C" here on page 114. Simply flip to one of the special Reader Service postcards inside the front cover and circle 114C. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.

you get

proven product protection

with packages of

ALUMINUM FOIL

"Our wrapper of Alcoa Foil not only guards delicate flavor—it catches the buyer's eye, creates sales," says Otto Wright, President of Davis-Cleaver, packers of Ferndale Frozen Chicken.

Keeping foods flavor-fresh in transit, in storage and in the home is only one of the many ways Alcoa Foil serves sales-minded, quality-conscious manufacturers in many fields.

How about *your* product? Can it use the sales lift sparkling Alcoa Aluminum Foil can give?

Let us send you names of leading package manufacturers, who are expert in designing packages of Alcoa Foil that sell *and protect*.

Address: ALUMINUM COMPANY OF AMERICA,
1763J Gulf Building, Pittsburgh 19, Pennsylvania.

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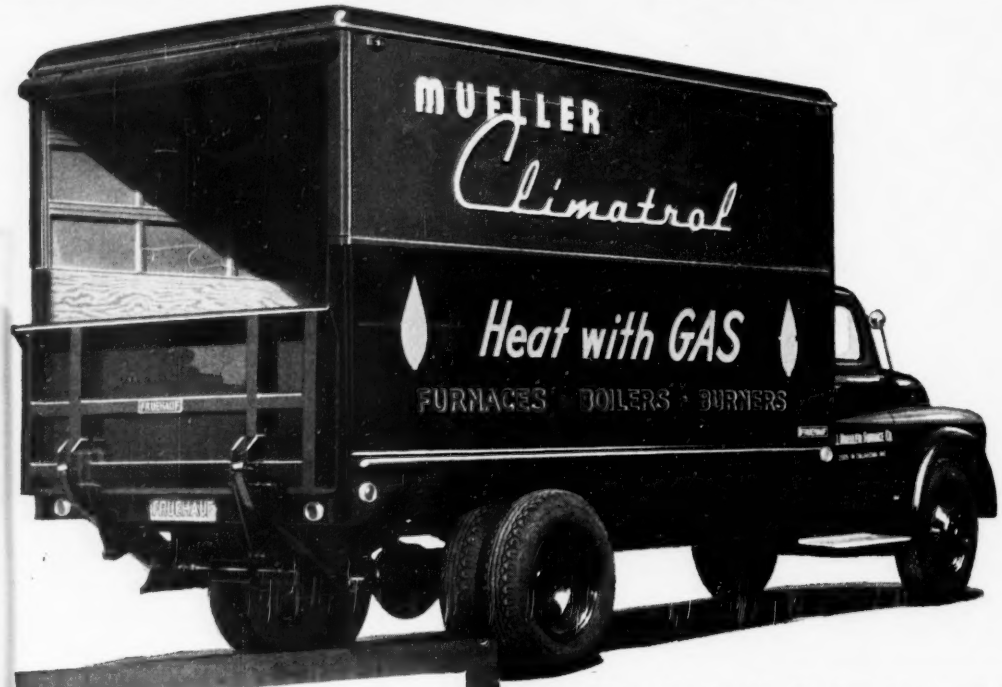
*Wrapper manufactured by Shellmar Products Corp., from Alcoa Foil.

FRUEHAUF "Unit-Built" VAN BODIES

NOW AS LOW AS $593.00 taxes extra

Typical of the outstanding buys at Fruehauf Branches today is this 12-ft. all steel, straight-frame body. Now yours complete—mounted on chassis, painted to match cab—ALL FOR ONLY $593. (Tarp and elevating end gate—illustrated—optional.)



FRUEHAUF ELEVATING END GATE

NOW AS LOW AS $378*

The time-saver that makes one man a complete crew!

*freight, taxes and installation extra

HERE'S the finest load handling "team" you can find today — a handsome all-steel, "Unit-Built" Van Body with a rugged hydraulic-powered Elevating End Gate. Both are Fruehauf built — designed to operate together as an efficient load handling unit.

A portable loading dock itself, Fruehauf's versatile Elevating End Gate speeds up pick-ups and deliveries by putting the power that pulls your truck to work loading and unloading it, too. Your driver, at the touch of a lever, becomes a complete loading crew.

For the load handling "team" best fitted to your need, see your Fruehauf Branch. Remember, Fruehauf builds Truck Bodies for *every* business requirement.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

DETROIT 32 • LOS ANGELES 58

IN CANADA: WESTON, ONTARIO

FRUEHAUF Truck Bodies

READY FOR THE ROAD IN A MATTER OF HOURS

Color-Coded Ice Cream A

Redesigned color-keyed-to-flavor cartons highlight Sealtest's latest packaged ice cream promotion. The new packs were conceived with the nations' food stores in mind, estimates indicating that over half of all ice cream is purchased in food stores, with self-service outlets leading the way.

National Dairy Products Corp., New York, retained Raymond Loewy Associates for the package remodeling program. The final result is this handsome color-coded-to-flavor line of cartons, featuring as-you-serve-it illustrations on four sides and company's trademark on all six sides. A printed, white panel at the bottom identifies each flavor. However, intent is for the basic color code to be more effective toward this end, both for customer and clerk. Colors are: Blue for vanilla, yellow for chocolate, green for strawberry, gray for special flavors, and royal purple for all nut flavors. These were chosen after careful consideration.

The line comes in both pint and half-gallon sizes. Latter size was adopted because experience proved that total sales volume was increased by use of the larger size.

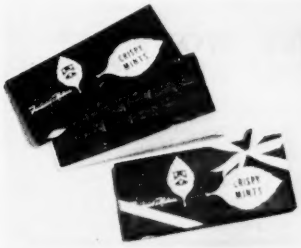
Stuffed, Frozen Lobster B

Frozen stuffed-and-broiled fresh lobster is now being offered by W. P. Williams, Inc., Bristol, R. I. Lobsters, after processing, are placed one in a carton, then frozen. For serving, the seafood is merely heated per directions.

The stuffing is composed of bread crumbs, butter, herbs and onion flakes. All inedible portions of lobster inside shell have been removed.

A color reproduction of the broiled lobster is printed on the bright white packaging material, giving an appearance of freshness. Instructions for preparation and serving are printed on the carton.

The package is formed of a rigid folding paperboard, Tufbord, manufactured by Robert Gair Co., Inc., New York.



Peppermint Honeycombs C

A chocolate-coated honeycomb, flavored with triple-distilled peppermint oil, is being packaged by Frederick & Nelson, Seattle, and sold in its department stores. Called "Crispy Mints," the new candy is offered in a well-designed 12-oz. box. The peppermint oil is furnished by I. P. Callison & Sons.

CLEAN UP WITH KLENZADE
DETERGENTS AND SANITATION CHEMICALS
KLEER-MOR
Popular wetting agent detergent for all hand cleaning jobs in the food industries. Rapid detergent and emulsifying action.
KLENZADE X-4
Concentrated powerful liquid-type sodium hypochlorite disinfectant and germicide. Ideal for food plants. Leaves no film.
STER-KLEEN
Organic acid detergent compatible with all quaternaries. Removes lime film and alkaline deposits from equipment.
STER-BAC
An outstandingly powerful quaternary for sanitizing food plant equipment and preventing mold growth.
Offices in Principal Cities
A Klenzade field technician will gladly call and help you plan a complete plant and equipment cleaning program.
KLENZADE PRODUCTS, Inc.
BELOIT, WISCONSIN

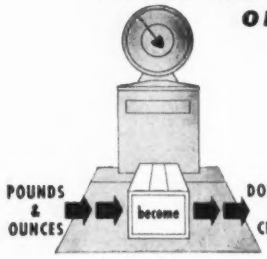
PRINTWEIGH STOPS ERRORS

For closer cost control in food industries — Toledo Printweigh Scales provide printed weight records . . . assure you that the accurate indication of the Toledo dial will reach your accounting records without chance of human error. Prints big, clear figures . . . on thick tickets . . . on large or small sheets . . . on strips . . . with extra copies. Saves time, stops losses and improves product - quality throughout your food plant—for receiving, batching, ingredient weighing, packaging, shipping or other weighing operations.

Ingredient weights recorded by Printweigh.

Accurate printed records provided by Toledo Motor Truck Sales.

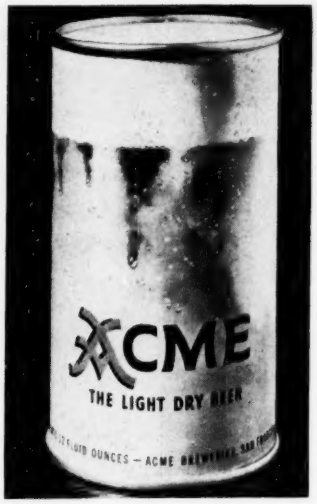
FOOD becomes MONEY on your SCALES!



Errors made at the scale stay wrong forever. There is no chance to recheck; either the food product has been shipped or has lost its identity in the general stock. You've got to be *right*—weigh it right — Toledo Printweigh means *accurate* weights *accurately* recorded! Send for bulletin 2021 on modern weight control. Toledo Scale Company, Toledo 1, Ohio.

Guard Costs with

TOLEDO *All the Way*



Beer Can With Head A

"Looks just like a cool glass of beer," say western beer drinkers when they cast an eye on Acme Brewing Co.'s redesigned can.

And this was exactly the realistic effect sought when Fred Cole, of the Foote, Cone & Belding agency, designed the foamy head right down to the condensed droplets. Printing has been kept to a minimum to give the unique design full play.

The lithographed can is made by Pacific Can Co.

Wine Vinegar Gift Box B

This attractive cardboard gift box of Maynor's California Wine Vinegars is serving to introduce the flavorings to retailers and consumers. And as would be expected, it is making good headway.

The four vinegars—burgundy with garlic, sauterne with tarragon, sauterne with dill, and burgundy with spices—are set off by the corrugated foil liner. Sprigs of fresh tarragon and dill are inserted by hand into the center two bottles. Company says its wine vinegar

Take advantage of this RASPBERRY flavor

It is the result of a series of original discoveries made in our laboratories in the course of research extending over a period of many years.

For the first time the flavor alone of sun-ripened raspberries has been lifted with absolute precision and converted into a tremendously powerful flavor material with physical characteristics specialized for commercial uses.

Its absolute uniformity is the result of completely controlled, synthetic construction. Its sure, solid raspberry flavor is the result of systematic research and exact knowledge.

FIRMENICH & CIE
SUCCESSEURS DE
CHUIT, NAEF & CIE
GENÈVE SUISSE

FIRMENICH & CO.

250 West 18th Street, New York 11, N. Y.

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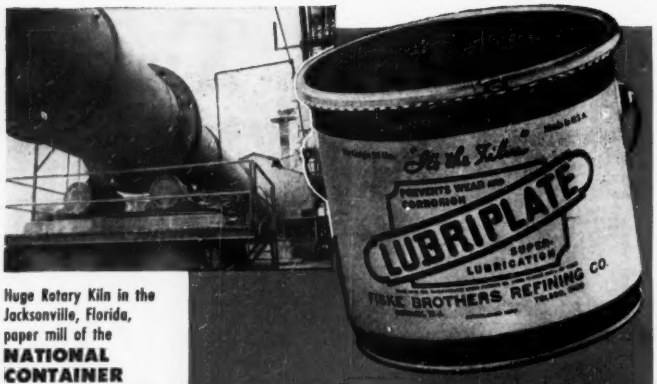
GENEVA, SWITZERLAND .... PARIS, FRANCE



Huge Rotary Kiln in the Jacksonville, Florida, paper mill of the **NATIONAL CONTAINER CORPORATION**

they say:

"We use This Lubricant on big, hot, heavy bearings, too!"

Following is an extract from a lubrication report made by the plant engineer at the Jacksonville, Florida, Plant.

7' diameter by 300' long lime kiln, supported by five sets of trunnion rollers.

Temperature inside kiln at hot end is approximately 1800° F.

Kiln turns at approximately 1 RPM, trunnions turn at approximately 3 RPM on 7" journals in sleeve bearings lubricated by LUBRIPLATE No. 8.

Since changing to LUBRIPLATE No. 8 two years ago, wear on all bearings and journals has been reduced to a minimum, where formerly a definite problem of lubrication existed.

It is in these unusually severe applications where LUBRIPLATE Lubricants dramatically prove their outstanding qualities. Probably more seemingly impossible lubrication conditions have been satisfactorily met with LUBRIPLATE in the past twenty years than by any other group of lubricants.

In most instances, LUBRIPLATE Lubricants have been introduced to solve a difficult lubrication problem. Their performance is so remarkable that their use is extended throughout the plant. They definitely reduce friction and wear, prevent rust and corrosion and save power.

LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases . . . a product for every lubrication requirement. Let us send you case histories of their use and savings in your industry. Write today.

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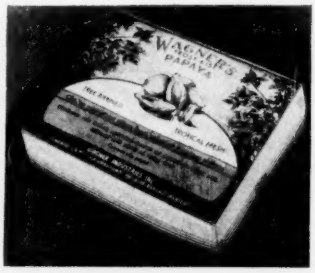
DEALERS EVERYWHERE—CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE

THE MODERN LUBRICANT

will not develop color precipitation which looks unsightly.

To produce its wine vinegar, the Pacific Vinegar Co., Inc., Richmond, Calif., runs wine through vinegar generators, and converts all the alcohol to acetic acid. Now constituting wine vinegar, the liquid is clarified, aged and pasteurized as it is bottled.



Popular Priced Papaya A

Long packed for a high-priced health food trade, frozen papaya is now being supplied to the regular consumer market.

Center-cut slices of papaya are packed and quick-frozen in both a 1-lb. container (pictured above) and a 2½-lb. carton.

Wagner Industries, Inc., with offices in Chicago, grows and processes the papaya, tradenaming it "Frost-Kist." It is packaged in Vapo Seal-Wraps made by Container Corp. of America. The carton consists of waxed paperboard overwrapped with cellophane. Roy A. Asmussen & Assoc., Inc., Chicago, has been appointed distributor.

Package & Product Shorts

Cookies Opened Like Cigarettes B

The first practical application of a rip-tape opener for cellophane-wrapped packages larger than cigarettes was recently announced by Mama's Cookies Bakery Co., Detroit. A sharp pull on the loose end of a red cellophane tape opens the heat-sealed cellophane covering of the firm's cookie box, and thus fuss is at a minimum.

Consumers Like "Alayam" C

New breakfast food made from sweet potatoes and wheat bran, called "Alayam," should find a ready market, according to results of consumer testing conducted by the Agricultural Experiment Station of the Alabama Polytechnic Institute, Auburn. The Alabama station, in cooperation with Bureau of Agricultural Economics developed the new food with the purpose of increasing sweet potato consumption in U. S.

Condensed Split Pea Soup D

Following its successful introduction in hotels and restaurants, a condensed split pea soup is being made available throughout the country by H. J. Heinz Co., Pittsburgh. This is company's 14th soup. —*End*

POLYETHYLENE TO KRAFT

A Field-Tested SEAM ADHESIVE

POLY-LOK

POLY-LOK is a ready-to-use, cold 'resyn' seam adhesive. For fabricating multiwall and specialty bags from polyethylene-coated kraft stocks. Combines high solid content with low viscosity. Machines cleanly on direct roller application. Tacks immediately even at the rate of 100 ten-pound bags a minute. Dries to a transparent, light gray film that is unaffected by variations of temperature or humidity. Ages without air-blistering.

POLY-LOK adhesive seams withstand hot calcium oxide at 250° F . . . food locker temperatures down to —20° F . . . protect food flavors . . . keep hygroscopic products from coalescing.

POLY-LOK is non-flashing . . . practically odorless . . . easily cleaned from glue pots with kerosene, toluene or naphtha . . . and it does not contain fast evaporating solvents.

POLY-LOK samples and technical data sent on request. Ask about other National adhesives for bonding polyethylene to bleached kraft, foil, burlap or polyethylene.

National ADHESIVES

PACKAGING TECHNICIANS!

These products, which were once bothersome or impossible to handle, are now being successfully packaged in multiwall bags lined with polyethylene-coated paper:

- Asphalt sealing compounds
- Fertilizers
- Silica gel
- Resins
- Magnesia
- Ion-exchange resins
- Phosphates
- Special cements
- Humus
- Calcium Chloride
- Peat moss
- Caustic soda
- Beta naphthol
- Brown sugar
- Cellulose acetate
- Urea resins
- Compost
- Quick lime
- Powdered milk
- Polyethylene resin
- Vinylite resin
- Detergents
- Meat trimmings
- Mono-sodium phosphate

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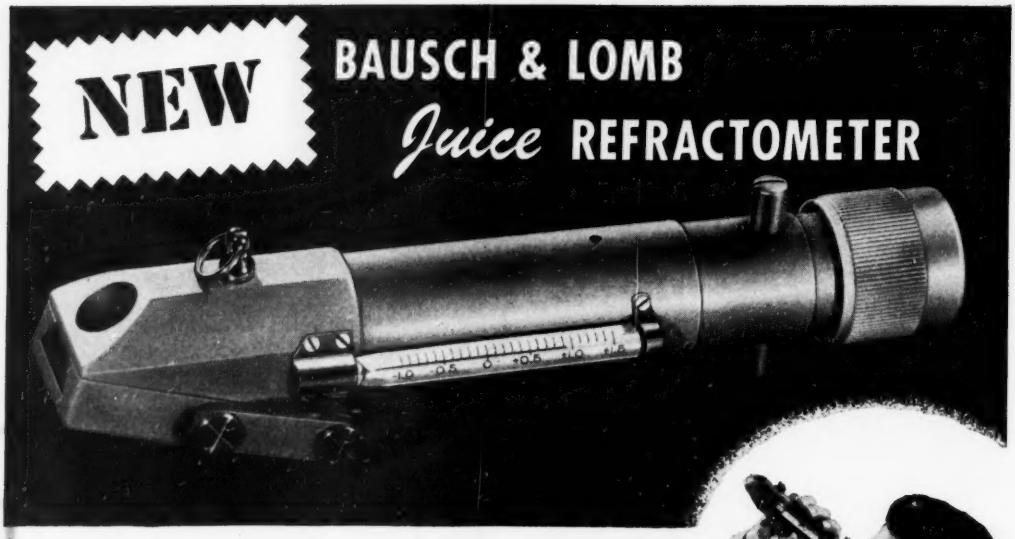
NEW BAUSCH & LOMB *Juice* REFRACTOMETER



USES *BOTH* TRANSMITTED AND REFLECTED LIGHT

For the first time, a hand refractometer is now available that uses either reflected or transmitted light—transmitted light for clear, transparent solutions . . . reflected light for dense, opaque or turbid samples.

FOR QUICK, ACCURATE ANALYSIS of citrus or vegetable juices . . . for easy on-the-spot checking in the plant or in the field . . . the new Bausch & Lomb Juice Refractometer is an ideal instrument.

DIRECT READING with no interpolation necessary. A precise scale, from 0 to 25% total solids, provides for readings made directly with high accuracy. Scale lines alternate on each side of the center line, even tenths on one side, odd tenths on the other . . . avoiding a crowded scale.

WELL-DEFINED, COLORLESS DIVIDING LINE assures accurate readings, speed and convenience. Angles of prism faces, and the selective compensating filter make the dividing line sharp. Self-seating cover prevents damage to prisms.

FOCUSING EYEPIECE adjusts to accommodate individual user's eyes. Combined with an easy-to-read internal scale, this helps eliminate guesswork in routine refractometric observation. Wide aperture gives complete unobstructed view of entire scale and borderline.

WRITE for complete information and demonstration of the new B&L Juice Refractometer. Bausch & Lomb Optical Co., 603U St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB *Juice* REFRACTOMETER

New Technology

Low Temperatures, Differing End Products Feature New Solvent Rendering System

Designed to produce desiccated raw animal tissues in the form of stable powders, with minimum loss of activity of vitamins, hormones, enzymes, and heat-labile substances in the non-fat portion, a new rendering process removes fat and moisture from the tissue rapidly and at low temperature. The end products differ somewhat from those obtained by conventional rendering plus solvent extraction of the raw material. The edible fat produced is reported to be free from cooking discoloration and fines, and responsive to bleaching and refining. The animal protein is grayish in color, granulated, odorless, and bland in flavor.

Prepared animal material and solvent are charged into a steam-jacketed vessel and heated to boiling. Water and solvent will boil off at a constant temperature below the boiling point of either. When practically all the water has been driven off, the temperature will rise, driving off residual water. The remaining miscella of solvent and fat, together with the meat solids, is discharged into a dryer where the miscella is drained from the solids and pumped to a kettle for fat recovery. Solvent vapors are recovered from all pieces of apparatus and returned to the system.

Several different solvents have been tested, and ethylene dichloride has been found satisfactory. Others are trichlorethylene and heptane. Plants can be designed to handle from 4 to 12 tons of raw animal material per 24 hr. day.

Digest from "New Solvent System Uses Low Temperatures," *The National Provisioner*, 16-17, June 10, 1950.

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Repeatable Iodine Numbers By New Quick Method

Determination of iodine numbers for degree of unsaturation in fats and oils, with one easily prepared and stable reagent, and in 1-min., is now possible by a modified Rosenmund-Kuhnhenn method.

The reagent is made as follows:

Place 40 ml. C.P. glacial acetic acid in each of 3 Pyrex erlenmeyer flasks. To the first flask add slowly 28.4 ± .2g. C. P. pyridine, with cooling. To the second, add slowly 35.5 ± .2g. C.P. conc. H_2SO_4, with cooling. When cool, add contents of second flask to contents of first flask, with further cooling.

To the third flask add the contents of a 1-oz. bottle of C.P. bromine. Add this solution to the mixture of the first 2 solutions and make up to 1 liter with C.P. glacial acetic acid. Mix thoroughly and transfer to a 4-l. amber bottle with screw stopper. Add a further 2,500 ml. C.P. glacial acetic acid. This solution is approximately 0.1 N with respect to bromine.

Recommended procedure follows:

To a sample of the oil in 5 ml. CCl_4, 50 ml. of above reagent is added followed by 10 ml. 2.5 percent mercuric acetate in glacial acetic acid. After standing for 1-min., 20 ml. 15 percent aqueous KI and 20 ml. water are added. After 1-min. liberated iodine is titrated with standardized 0.1 N sodium thiosulphate, using starch as indicator. Blanks containing everything except the oil are run simultaneously.

Iodine number is calculated by the formula: I.N. = [100 (A-B) C] /S where A = ml. O.1N thiosulphate used in blank; B = ml. O.1N thiosulphate used for sample; C = mg. iodine equivalent to 1 ml. thiosulphate sol., and S = sample wt. in mg.

Digest from "An Improved Method for the Determination of Iodine Numbers," by G. H. Benham and L. Klee, *The Journal of the American Oil Chemist's Society*, 127-29, April, 1950.

Domestic Sesame Oil Amenable To Conventional Processing

Sesame seed grown in South Carolina and Nebraska have been solvent-extracted with hexane, and the resulting oils have been tested in the usual manner to determine their chemical and physical properties. The investigation is of interest in view of the intensive programs for improvement of sesame now in progress in the U. S. and Venezuela. It is thought that new varieties might eventually be adapted for mechanical harvesting.

Only slight variations were found

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—to give you the cue here every month on all the latest, most applicable food formulas, facts and figures. He's constantly scrutinizing developments and "memo-ing" the details so you're informed all along the line—and so you're ready to act fast on any advance affecting your field.

Also, what's around the corner? Well, just watch here with Mr. FI. For his delving into the new technology of today really gives you a preview of the production line processes of tomorrow. Keeps you thinking up front.

Take the abstract on this page describing the new solvent extraction system. There's a prime subject. About animal tissues here, but a technic that has bearing in other lines—as fish and vegetable oils. All solid information.

Notice, too, the handy index (top right). See how Mr. FI divided the technology into specific functions as well as fields. Makes reference handy.

Yes, a wealth of values. Every month. And we'll wager that if you pull up a chair here just once, from then on you'll want to reserve it.—The Editors

NEW

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featuring

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. . . for high-speed drying of glues, gelatins, etc.

The answer for drying substances which do not withstand high temperatures of conventional drying methods has been recently introduced to industry. Designed by Douglas M. McBean, well-known food processing engineer, in cooperation with Kathabar humidity control engineers, the new drying tunnel employs very dry air to extract moisture. In actual installation on glue drying lines, the new drying system achieves faster drying action at close to room temperatures . . . and gives greater low-temperature drying capacity in less space. In addition, the McBean Continuous Drying Tunnel is available as a complete unit thereby concentrating the responsibility for installation and correct operation in one source.

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in the constants and in the composition of the oils. They were refined, bleached, hydrogenated to shortening consistency, and deodorized. Refining losses were low, and bleach colors light. Changes in composition and in the values of the refractive index and plasticity during hydrogenation were similar to those of other oils of like characteristics. Results show that conventional methods of processing can be applied with good results.

Digest from "Sesame Oil. II. Some Chemical and Physical Properties of the Oils from Different Varieties of Sesame Seed," by F. G. T. Menezes, P. Budowski, and F. G. Dollear, *Journal of the American Oil Chemists' Society*, 184-86, May, 1950.

FRUITS AND VEGETABLES

Vitamin Content of Vegetables Not Affected by Freezing

Loss of riboflavin in frozen vegetables is due to pre-freezing treatment, and does not continue during frozen storage. These are conclusions based on experiments with four vegetables. These vegetables, Dark Podded Thomas Laxton and Little Marvel peas; Asgrow Black Valentine snap beans; Giant Green soybeans, and Bloomsdale Savoy Long Standing and Virginia Savoy spinach, were harvested at suitable stages of maturity for freezing, properly prepared and blanched in boiling water. They were then immersed in cold water, drained, packed in cellophane-lined pint containers, heat sealed and finally frozen in a plate-type freezer at —11.2 to —22 F. for 20 hr. Frozen vegetables were kept in storage at 0 F. ±5 deg. for 1, 3, 6, and 9 months.

During the blanching to 20-hr. freezing steps, peas lost 10-22 percent of their original riboflavin content; snap beans 4-15 percent; soybeans 19-22 percent, and spinach 30-45 percent. No further losses occurred during frozen storage.

Digest from "Retention of Riboflavin in Vegetables Preserved by Freezing," by F. O. Van Duyne, J. C. Wolfe and R. F. Owen, *Food Research*, 53-61, Jan.-Feb. 1950.

Canned, Pasteurized Dates Retain Color and Flavor

In packaging dates for retail trade it is customary to select fruit of about 25 percent moisture, and to wrap in transparent films. Thus marketed, they have a tendency to become increasingly dark in color due to action of oxygen.

A new method of canning and pasteurizing, however, has made possible the preservation of dates of 30 percent moisture having an excellent flavor and color.

Essential steps in the new process are: Loosely packing about 7 oz. of dates in a 211 x 400 enamel-lined can, adding about 1 ml. of water, vacuumizing at 28 in., releasing the vacuum with nitrogen gas of 99.5 percent purity, closing, pasteurizing for 45 min. in boiling water, and air-cooling so that room temperature is reached in about 2 hr. Oxidative reactions causing darkening are inhibited by packaging in an atmosphere of nitrogen or carbon dioxide, and the product has an excellent color.

Digest from "Processing and Packaging of Dates. I. A New Method of Canning and Pasteurizing Deglet Noor Dates," by B. W. Nielsen, R. J. McColloch, and E. A. Beavens, *Food Technology*, 232-37, June, 1950.

SANITATION

New Potent Fungicides

Larger fruit and vegetable crops are now assured with the aid of a new series of fungicides, derivatives of dithiocarbamic acid. One of these is used to treat seed corn, peanuts, onion and vegetable seeds to protect them against seed- and soil-borne organisms that cause decay and seedling infection. An iron salt of the acid is used to control cedar rust of apples, apple and pear scab, brown rot of cherries and cranberry fruit rots. The zinc salt is excellent for control of anthracnose and leaf diseases of tomatoes, beans, cucumbers, melons and celery. And a zinc ethylene bis salt, when used with zinc sulphate is a superior fungicide for control of late blight in potatoes and tomatoes.

Digest from "New Fungicides Promising Larger Crops," a paper by W. H. Tisdale and A. L. Fenner presented before Div. Agr. Food Chemistry, ACS., Philadelphia, Pa., April 12, 1950.

Efficiency of Quaternaries Reduced In Hard Water

Quaternary ammonium compounds are known to be selective in their action on bacteria. And their bactericidal activity is affected by the hardness of the water in which they are used, the concentration of organic matter, the temperature, and the use of lime-precipitating agents. They are more subject to such effects, relatively, than sodium hypochlorite, and different quaternaries are affected differently by these factors.

In tests of 6 quaternaries, compared with sodium hypochlorite solutions, the germicidal power of the former was reduced to low levels by an increase in hardness of water from 0–400 ppm., while the hypochlorite solutions were not affected. To maintain the same

killing powers under these conditions, concentrations of some quaternaries had to be increased from 25 to 10,000 ppm.

Sodium aryl sulfonates seriously reduced the germicidal activity of all the quaternaries, but hypochlorites were not affected. On the other hand, the presence of 1,500 ppm. milk solids had much less effect on quaternaries than did 500 ppm. of sodium aryl sulfonate. Milk solids also affected the hypochlorites—an increase from 10–50 ppm available chlorine was necessary in order to maintain the same activity.

Reducing the temperature from 68 to 40 deg. F. had no effect on hypochlorites (10 ppm.) but required 4 to 400-fold increases in quaternary concentration to get the same bacteria killing power. Addition of trisodium phosphate to hard waters containing quaternaries carried down as much as 90 percent of them with the lime-floc. Others were decomposed by this treatment. Hypochlorites were not affected.

Digest from "Comparison of the Disinfecting Properties of Hypochlorites and the Quaternaries," by Lewis Shere, *La Industria Cervecera* (Buenos Aires), Vol. XIX, Nos. 226-27, 2-5, Nov.-Dec., 1949.

CEREAL PRODUCTS

Grain Germinating Capacity Determined Chemically

Chemical tests that may be used for determining germination of grains to be used in the manufacture of malt have been recently developed. Of these, the use of dinitrobenzol, sodium biselenite, and most recently triphenyltetrazolium chloride have been most widely studied. The first two compounds are objectionable because they are poisonous; biselenite also has an obnoxious odor, since hydrogen selenide is liberated during the determination. Color developed by dinitrobenzol is evanescent, while that of biselenite is permanent. Tetrazolium chloride is non-poisonous and gives a permanent color. Its results check closely with those obtained by the direct sprouting method. It takes somewhat more time and practice than the other colorimetric methods, since for best results the kernels of grain must be given a brief soaking and then have their germs dissected out with a sharp-pointed scalpel. On immersing the germs in a 1 percent solution of tetrazolium chloride for 3-4 hr. at 86 F. the viable germs are stained a red color and can be counted. Two hundred kernels are generally used and the entire method takes 9—10 hr. This method seems to be the most reliable even though it takes more time than either the dinitrobenzol, (2 hr.)

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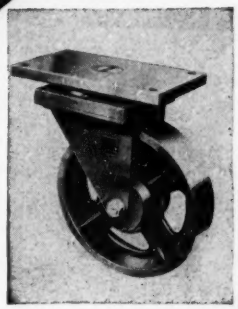

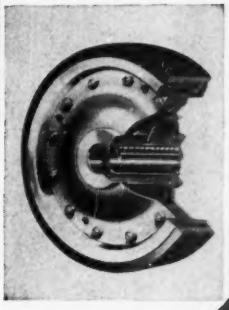

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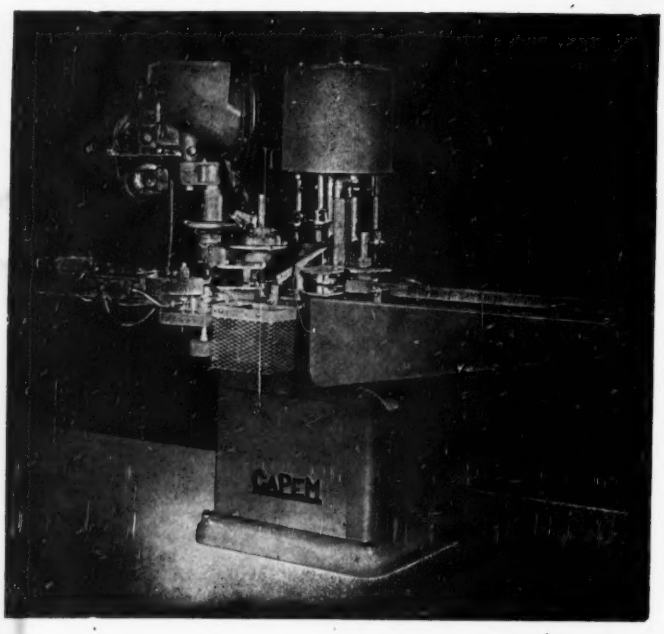

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or the sodium biselenite (5 hr. minimum) methods.

Digest from "The Rapid Methods of Determining Germination Especially by the Use of Tetrazolium Chloride," by H. Fink and E Schwieger, *Brauwissenschaft*, Vol. 3, 68-73 March, 1950.

FISH

Faulty Stowage at Sea Causes Fish Spoilage

Investigation of the cooling rates of gutted fish stowed in the hold of schooners at sea has revealed information that should be helpful in preventing spoilage. Tests were conducted on two vessels: One in which the hold was insulated but not refrigerated, and the other in which there was neither insulation nor refrigeration. Cooling rates were determined for fish in different parts of the hold.

Summarizing the results: Fish iced in layers of a foot or more in thickness cannot be cooled rapidly enough to prevent spoilage in either insulated or non-insulated vessels during a normal trip at sea. Artificial refrigeration is needed to prevent spoilage along the back wall of the pens and in the central part of the hold where ice tends to disappear rapidly. Intimate mixture of ice and fish in the hold produced very rapid cooling. Fish stowed close to the deckhead tended to spoil because proper icing was impossible. Even with repeated topping of the pens there was a good chance for spoilage unless the fish were stowed not higher than 15 in. from the deckhead.

Digest from "An Investigation of the Cooling Rates of Gutted Fish Stowed in Schooners," *Techno-Logic*, Vol. 2, No. 5, May 6, 1950. National Fisheries Institute, Washington 1, D. C.

DAIRY

Whipping Cream Packaged In Pressurized Cans

Post-war development of single-trip low-pressure containers for such civilian items as insecticides naturally suggested the adaptation of the idea to the packing of pressurized whipping cream. In whipping cream by effervescence the gas is dissolved in the cream under pressure. Upon release of the pressurized cream to atmospheric pressure, the gas passes out of solution but tends to remain in the creamy mass as a foam.

In commercial procedure the pasteurized cream, 30 percent butterfat or higher, is mixed with sugar, vanilla

flavoring, and a stabilizer such as dehydrated egg albumin, dehydrated egg yolk, sodium caseinate, gelatin, or skim milk powder. About 7 fluid ounces of this mix is filled into a 12-oz. pressure container and passed to the gasser where it is charged with either 100 percent nitrous oxide or 85 percent nitrous oxide and 15 percent carbon dioxide. The gassed cream is shaken violently for 10 to 30 sec. to hasten equilibrium between the cream and gas in the headspace and partly clumping the butterfat. Equilibrium pressures of 75 to 90 psi. are usually obtained, producing an overrun of 250 percent, or a yield of 25 oz. of whipped cream from the original 7.

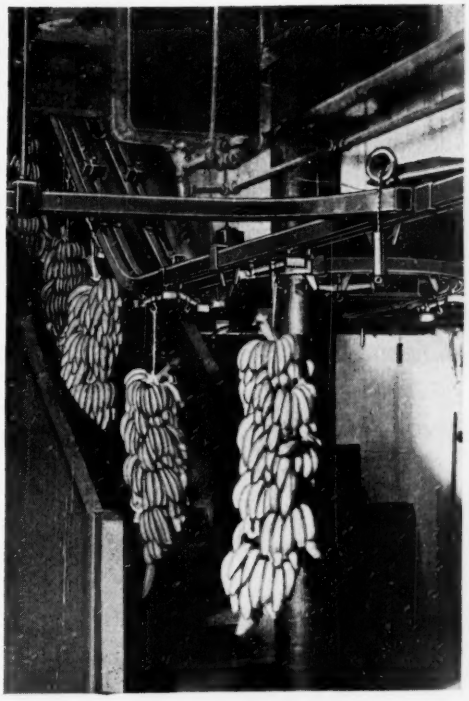
Digest from "Packaging Whipping Cream in Pressurized Containers," by Earl Graham, *Food Technology*, 225-29, June, 1950.

SUGAR

Improved Nitrogen Removal From Beet Sugar Juice

Nitrogen in beet sugar juice occurs mainly as organic amino compounds. Complete removal is desirable because: (1) These compounds comprise 20-25 percent of the non-sugar impurities in the juice; (2) browning properties of ion-exchange treated juice are related to its residual N content; and (3) these compounds have a potential byproduct value. The present study of N removal from beet-sugar juices by ion exchange was undertaken to see if modifications of the process would economically improve over-all N removal. Different combinations of bed sequence, exhaustion end points, and regenerant treatment of beds were examined.

Three modifications of the exchange cycle were developed, with characteristic N removals: (1) Single pair treatment in equal bed volumes, to the titration break on the cation column with NH_3 regeneration on this column every 25-30 cycles, yielding a 45-50 percent N removal; (2) single pair treatment in equal bed, to a pH of 7 end point on the anion effluent, with NH_3 regeneration on the cation column every 25-30 cycles, yielding a 65-70 percent N removal; (3) passing the juice through two cation cells followed by one anion cell, with equal bed volumes. The primary cation bed is given normal cation regeneration plus NH_3 regeneration every 50-60 cycles, and the secondary cation bed is given NH_3 treatment prior to normal regeneration every cycle. The primary cation bed is operated to the titration break-through. This cycle will yield an 89-90 percent N removal. The division of N compounds removable by ion exchange, is 70-80 percent



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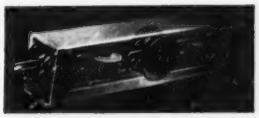

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by the cation bed and 20-30 percent by the anion bed.

Digest from "Nitrogen Removal in Ion Exchange Treatment of Beet Sugar Juices," by R. T. Jacobs and F. N. Rawlings, *Journal of Industrial and Engineering Chemistry*, Vol. 41, 2769-74, Dec. 1949.

MISCELLANEOUS

Make Tasty Soy-Like Sauce From Cottonseed and Wheat

A new sauce for flavoring soups and vegetable dishes that resembles the soy sauce of China has been produced at the Texas Engineering Experiment Station using 5 parts cottonseed kernels to 2 parts wheat. Cottonseed is first cooked under pressure, then the parched wheat is added followed by cultures of green mold, yeast and bacteria. The mixture is placed in trays and incubated 4-5 days. A brine solution is then added and this mixture incubated for 1-2 months and strained. Heating the liquid to kill all organisms is followed by filtering and bottling.

For commercial practice, a shorter method, utilizing an acid hydrolysate with molasses added to give the desired color, may be used. This product lacks many of the flavor characteristics of the fermented product, however.

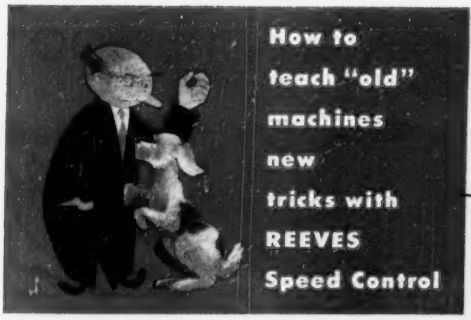
Digest from "Chemurgists Create Tasty New Sauce From Cottonseed Kernels and Wheat," by L. J. Horn, *Texas Chemurgic News*, May 1, 1950.

Mushroom Mycelium Grown On Submerged Culture

Duplication of flavor without the expense of ordinary mushroom growing may result from application of two new submerged culture processes. In them, mushroom spores are seeded into large tanks of nutrient medium (organic wastes such as asparagus-butt juice, pear-waste juice, rice-bran extract, or synthetic medium) and grown in the fermentation process for penicillin. The resulting product is comparable in food value and flavor with fresh mushrooms. By timing the harvest, taste can be controlled as desired.

The two methods for producing the mycelium are: (1) That developed by Dr. Joseph Szucs of Boyce Thompson Institute, which produces small spheres similar in form and consistency to caviar, or a smooth puree, and (2) that of Dr. Harry Humfeld, WRRI. The latter product is a creamy material which may be frozen, canned as a slurry, or centrifuged and canned as a cake.

Digest from "Mushroom Mycelium," from *Industrial Bulletin of Arthur D. Little, Inc.*, No. 268, May, 1950. —End



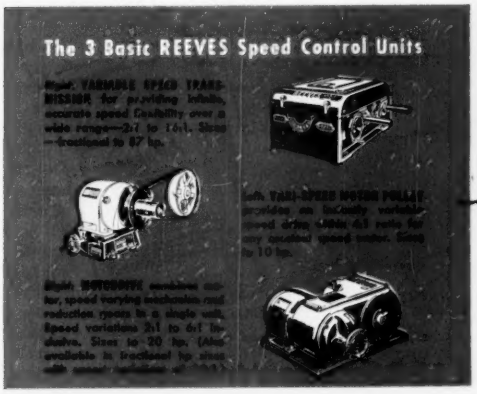
Example: Assure accurate timing of heating and cooling operations

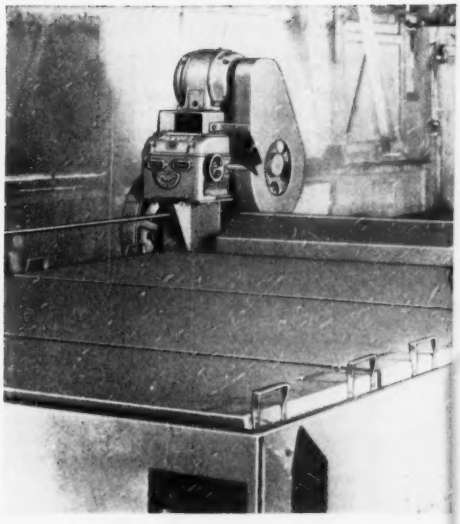
If you are using fixed speed machines for your heating, cooling, baking, drying, cooking or chilling operations, you have a real and vital need for accurate, infinitely variable REEVES Speed Control. Here's why!

With the mere turn of a handwheel or touch of a button, the operator can instantly obtain the speed that will assure the correct timing for each material or product in process, in conformance with its own special requirements. You get exactly the right finish, texture, temperature or consistency—and you get it without losing costly time for belt or pulley changes. You improve quality of production and rate of production . . . *and you do it right now!*

REEVES Variable Speed Drives are easily and economically applied to any driven machine. Variations of the three basic REEVES units are available in a wide range of sizes, designs, capacities and speed ratios, and with your choice of manual, push-button or completely automatic controls.

Survey your plant today. Wherever you have fixed speed machines, there, potentially, *and very probably,* is a place where REEVES can increase your production and your profits. Send right away for complete information, as contained in Catalog FD36-1-3N.





Illustrated above is a typical application of REEVES Speed Control in the canning industry to assure accurate timing. The unit installed on this exhaust box is a REEVES Variable Speed Transmission (indicated by arrow). Here, REEVES accurately provides the exact length of exhaust time required for a wide variety of food products and various sizes of cans being run. Results are instant and positive: greater production and higher, more uniform quality of product. In the same tested way, in many plants, on many different machines, REEVES accurately controls heating, baking, drying, cooking, cooling or chilling time. For other cost-cutting "tricks" performed by REEVES Speed Control, refer to the list below.

REEVES PULLEY COMPANY, COLUMBUS, INDIANA

Recognized Leader in the Specialized Field of Speed Control Engineering

accurate - variable
REEVES *Speed Control*

Other Uses:

Handle more shapes, sizes and materials • Match skills of operators • Compensate for changes in character of product in process • Maintain uniform peripheral speeds • Maintain uniform pressure, temperature, liquid level, etc. • Regulate conveyor speeds • Synchronize parts of one machine or different machines operating in series.

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Your finished product deserves the finest. Secure maximum sales and eye appeal by using Sterwin's Parakeet Certified Food Colors.

These pure food colors are manufactured by Sterling's Hilton-Davis Chemical Co., leaders in the color field for 25 years. Their experience and know-how guarantee the production of top quality certified food colors.

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WORLD'S LARGEST SUPPLIERS OF VANILLIN

Food Industry News

Bread Bakers Not Greatly Concerned Over Proposed F&DA Standards

Food & Drug Administration's tentative bread standards, issued last month, had little immediate effect upon the baking industry. Although not quite expected, the ban on emulsifiers and softeners left the country's large bread bakers right where they were. While few, if any, of the big companies had offered objections to the use of these chemicals, they had decided to await their clarification by F&DA before considering their use. Among the smaller bakers, where the softeners and emulsifiers were widely used, little difficulty was expected in shifting to the permitted glycerides.

There can be no doubt, however, that the tentative standard represented a first round victory for shortening producers. Their contention that the "poly" products had not been completely proved nondeleterious and nondeceptive appeared to carry great weight with the administration's decision to exclude them as optional ingredients.

Most seriously affected by the order is the Atlas Powder Co., Wilmington, Del. This producer of food emulsifiers would see many years of research and product development go down the drain should the final bread standard and and other standards yet to be issued continue to exclude their products. Unlike Atlas, another major producer, Glyco Products Co., Brooklyn, N. Y., also produces the glycerides. Both companies, however, planned to file exceptions.

The 40-page tentative order recognizes the oxidizing agents potassium bromate, potassium iodate and calcium peroxide as optional ingredients. Chemicals permitted to retard mold growth were sodium and calcium proponates, sodium diacetate, iatic acid and monocalcium phosphate. Ammonium and calcium salts may also be used.

Other provisions of the tentative order are:

Soy flour is recognized as an optional ingredient of white bread up to 3 percent of the weight of the flour used.

Dried cheese whey is recognized as an optional ingredient but a chemically treated dry whey is not so listed.

Maximum and minimum limits of thiamine, riboflavin, niacin, and iron are set up in the standards for enriched bread.

Milk or non-fat dry milk solids and milk fat, and not water, are to be used as the wetting ingredients.

Whole wheat bread may be called "graham bread" or "entire wheat bread." The proposed order contains detailed standards for breads made of white and whole wheat flours. But bread made from a mixture of white and whole wheat flours cannot be called "wheat bread."

Under the proposed order it would not be necessary to have bread labeled to show all the ingredients used. Only the names of the optional ingredients used which retard the spoilage of bread are required on the label.

Canner Use of Subtilin Falters in Tests

Subtilin additions for bacteria and spore control do not now appear to be at all certain as was hoped when Bureau of Agricultural & Industrial Chemistry announced preliminary work some months ago. Other laboratories have been undertaking to extend our knowledge of that subject but without success in confirming the earlier indications.

Probably most singificant are the studies of the research laboratories of National Canners Assn. in Washington, D. C. Conclusions reached there indicate that the advantages anticipated are not as great as hoped for. Subtilin and other antibiotics may produce conditions that prevent rapid development of spores or dangerous bacteria. But the kill is certainly not complete in the tests made up to mid-August in the NCA laboratories.

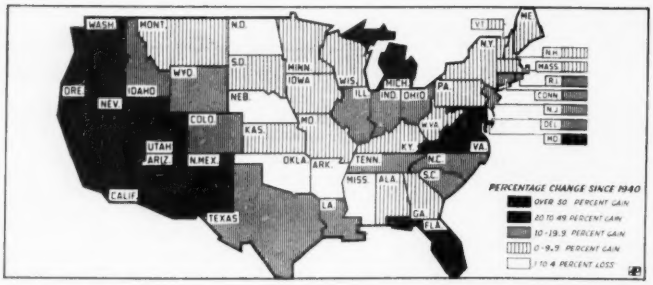
Candy Sales Data

Eighty-three percent of the U. S. population, or 124,500,000 Americans consume the nation's output of candy, according to a compilation of the role played by candy in the retail food field, recently published by E. J. Brach & Sons, Chicago. On a dollar basis, amounting to a per capita expenditure of $7.17, the survey finds 45 percent is spent in food stores.

In a further breakdown of its data, the Brach study finds the average family spending 25.2c. weekly for the purchase of candy in food stores. This expenditure outranks many of the staples and provides a 25 percent or more gross margin compared with a representative food chain's overall gross margin of only 15.8 percent.

Fighting Rations

Those rations for combat troops that the Quartermaster and the food industry have been studying for the past several years went into actual use much earlier than most expected. Here's a shipment being unloaded somewhere in South Korea for relay to the United Nations' front line fighting men. (Wide World)



Population Shifts

Here is a quick check on the shifting pattern in food distribution. Based on preliminary findings of the 1950 Census, compared with the 1940 count, the population shifts range from actual losses in North Dakota, Nebraska, Oklahoma, Arkansas and Mississippi to a 51.6 percent gain for California. (Wide World)

Food Company Earnings Hold Fairly Steady

Though total sales showed a slight downward tendency, earnings of food companies appeared to be holding firm, according to financial reports received this month.

General Mills, Inc., had earnings of $13,251,218, the highest in the company's history, during the fiscal year ending May 31, 1950. Total sales for that period were $395,834,706. Earnings for 1948-49 were $11,654,036, while total sales approximated those of last year.

Gross income for Standard Milling Co. dropped from $43,639,833 in 1948-49 to $39,902,062 in 1949-50. Net earnings were up, however, with $143,009 for the recent fiscal year topping $10,209 for the previous period.

H. J. Heinz Co. reported total sales of $170,508,252 for the fiscal year ending May 3, 1950, down from $174,877,723 for a year ago. Net earnings of $4,364,017 were lower than the $6,451,048 for the 1948-49 period.

During the 11-month period ending March 31, 1950, British Columbia Packers Ltd. showed a net profit of $1,078,781 on total sales of $29,198,295. These figures exceed those reported for the 12-month period ending April 30, 1949—earnings of $995,891 on sales of $27,333,390. The 1950 report is on an 11-month basis because company changed its fiscal year to correspond with its operating seasons.

For nine months ended June 30, 1950, Canada Dry Ginger Ale, Inc., reported sales of $38,680,206 compared with $36,582,550 for the same period in 1948-49. Net profits for 1950 amounted to $1,805,845, exceeding earnings of $1,270,298 for the corresponding nine-month period of the previous year.

Total sales of National Dairy Products Corp. declined from $456,218,089 in the first half of 1949 to $440,985,392 in 1950. Earnings for the first six months of 1950, however, rose to $17,587,399, compared with $16,537,423 in 1949.

The Borden Co. indicated sales of $295,897,609 for 1950's first half, 3 percent lower than the $305,047,723 received during the like period last year. Earnings also dropped in 1950, the estimated figure being $9,850,000, down from 1949's estimated $10,200,000.

A first half report of Standard Brands Inc. shows net sales of $132,831,545, as compared with $126,202,610 in 1949's first half. Net income also rose, amounting to $4,798,908 in 1950 as against $3,751,768 in 1949.

Continental Baking Co. revealed net sales of $72,322,877 for the first half of 1950, down from $74,315,326 for the corresponding period of 1949. Net earnings also dropped, falling to $1,982,712 from 1949's $2,562,649.

A. E. Staley Mfg. Co., processors of corn and soybeans, reported gross income of $6,288,506 for the six-month period ending June 30, 1950, slightly down from a figure of $6,360,349 for the same 1949 period. Net earnings fell even further, from $1,995,830 in 1949's first half to $1,845,354 in the 1950 period.

Caution Ice Cream Makers On Vegetable Fats

Federal Security Administrator Oscar R. Ewing has reminded the ice cream manufacturing industry that the Food & Drug Administration, which is part of the Federal Security Agency, continues to consider ice cream containing vegetable fats in the place of milk fat "adulterated within the meaning of the Federal Food, Drug, & Cosmetic Act, and therefore subject to action under the law."

In issuing this reminder, Mr. Ewing also stated that the agency will reopen hearings on ice cream standards in Washington in the fall.

He called attention to his statement of interpretation issued last April, in which he declared:

"The Federal Security Agency has received a number of inquiries regarding proposals to market in interstate commerce a frozen product made in semblance of ice cream, but containing vegetable fats in complete or partial substitution for milk fat. It has been stated that the product is being currently manufactured in several states for distribution wholly within the borders of the state in which it is made.

"This Agency regards products of this type, in which any vegetable fat is used as an ingredient, as adulterated within the meaning of the Federal Food, Drug, & Cosmetic Act, and therefore subject to action under the law."

Since this statement was issued, Mr. Ewing said, the Food & Drug Administration has been investigating use of vegetable fats as a substitute for butter fat in the manufacture of ice cream. A number of ice cream manufacturers are now following this practice, but avoid shipment of their products in interstate commerce and therefore do not come under Federal law.

In a few cases, the Federal Security Administrator reported, Food & Drug inspectors have found interstate shipments of frozen desserts containing vegetable fats, which the public purchased under the impression that these desserts were actually ice cream. Criminal prosecutions are now in the course of preparation.

Reports on Food Seizures Prove "Disappointing"

In answer to a clamor raised by consumer groups that the Federal Security Agency publish immediate notices of seizures of contaminated food and convictions obtained, the Food and Drug Administration has recently begun issuing monthly reports to the press.

The reports reveal no startling frauds or any wholesale amounts of contaminated foods moving in interstate commerce.

The paucity of seizures is regarded as a disappointment to these groups. Some of them are affiliated with leftist causes and fellow-traveler groups and use the "consumer protection" cry as a smokescreen to attack businessmen and the private enterprise system.

During June, for example, the F&DA obtained 43 convictions of the Food, Drug & Cosmetic Act. Of these 43 convictions, 20 involved unfit food and 6 were based on misbranded foods and animal feeds.

As usual, the guilty were mostly small plants, retailers, and one-man "fly-by-night" outfits.

Three of the June convictions (the Missouri rabbit cases) were for offering for sale "partly decomposed wild rabbits, contaminated with fecal filth and improperly cleaned."

One individual was fined $25, a dealer $300 and costs, and a commission firm $250.

Only two firms operating nationally were found guilty during the month. One firm was fined $1,400 for having a food preparation labeled "sterilized" when upon examination it was found to be non-sterile. A breakfast food firm was fined $2,000 for "producing and holding under insanitary conditions" a quantity of corn flakes.

During the same month (June) the F&DA seized 65 interstate shipments of food on charges of failure to comply with the Federal law.

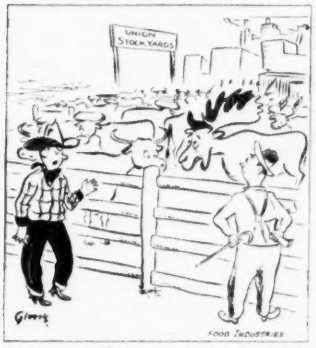
In volume, the foods removed from the market varied from 27 lb. of coffee containing undeclared chicory to 800,000 lb. of cereals that were insect-infested or moldy.

Candy Conference

Dates for the fifth annual production conference sponsored by the Pennsylvania Manufacturing Confectioners' Assn., have been set for April 26 and 27, 1951. Lehigh University, Bethlehem, Pa., will again provide the meeting place—its Institute of Research.

Chairman of the conference is Hans F. Dresel, 15 Lombard St., Philadelphia 27, Pa.

Highlight of the meeting is expected to be on the re-use of trimmings, which will be discussed by four prominent candy manufacturers.



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If fire protection measures are warranted in commercial and industrial structures where dollars are at stake, how much more necessary is every possible safeguard in buildings where helpless lives are constantly in jeopardy?

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You and every other executive with an appreciation of good business logic must not overlook the importance of absolute fire safety, for you can *save lives . . . save property and save money with "Automatic" Sprinklers*.

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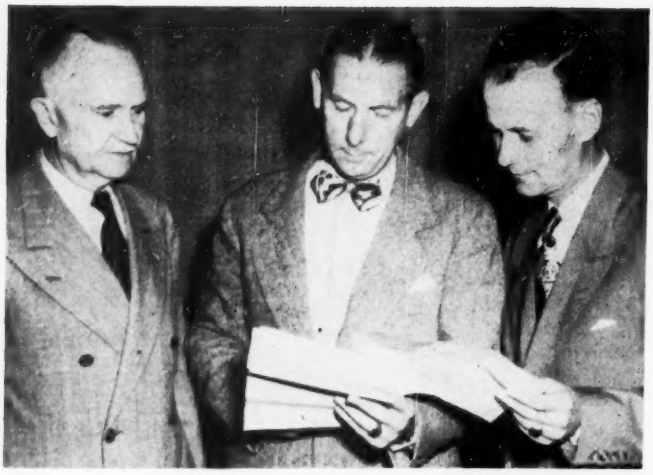

New Wheats Reported

Two new varieties of Pacific Northwest wheats, Brevor and Elmar, were recently reported to be of superior quality and to outyield older varieties by 10 to 15 percent by S. P. Swenson, dean of the College of Agriculture, Washington State College. He is shown here at right with J. A. Shellenberger, president, American Assn. of Cereal Chemists and head of Dept. of Milling Industry, Kansas State College, and W. L. Haley, Fisher Flouring Mills, Seattle.

Alter Packaging Program For Institute Forum

The military situation in Korea and its possible future expansion has forced the program committee of the Packaging Institute to revamp its original plans for the program of the 12th Annual Forum, at the Hotel Commodore, New York City, October 23, 24, 25.

"We are no more able to predict the outcome of events in Korea than the authorities in Washington," said E. H. Balkema of Colgate-Palmolive-Peet Co., Chairman of the Institute's program committee, "but two facts must be taken into consideration in revising the projected program. First, is the uncertainty of the future of the police action which may be of short or long duration, and America must be prepared for a long duration. Second, are the definite trends toward price increases, apparent scarcities and larger military orders requiring special packaging specifications.

"One session will be scheduled therefore to include a well informed government representative to discuss the methods of military procurement as they affect packaging. Also a spokesman from the packaging field is to tell the government what industry needs from government in order that industry may supply the government needs. In particular, it is hoped, the government agencies will handle the situation so that industry representatives will know where to go to get approvals of performance of packaging materials and finished packages where military orders are involved.

"Another aspect to be covered is the manner in which the National Security Resources Board is planning to handle packaging for civilan needs and to coordinate civilian packaging with the military demands for already reports are current of scarcities of sheet steel and aluminum, of rubber and plastics. It is obvious that military needs must come first but it should be equally obvious that adequate planning must endeavor to avoid industrial dislocation."

The outlook for packaging supplies, machinery and personnel as of Oct. 23, is also to be covered by well informed speakers.

Quartermaster Gets Bids On "Assault" Packs

Bids were received early in August by the Chicago Quartermaster Depot on components and assembly of 3,000,000 new type emergency food packets. To speed procurement, the normal 30-day advertising time for bids was reduced to 10 days.

The new type packet was developed by the Quartermaster Corps since the end of World War II. It is small, light in weight, and made up of highly nourishing component, which the soldier may easily carry in his pocket or pack.

Called an "assault" packet, it is to be used in addition to presently available combat rations that are delivered to troops separated from the kitchens of their commands. Packed in a lightweight cardboard box, 6-7/8x3-9/16x 2-7/8 in., the components of the new food packet have a food value of 900 calories—about three-fourths the calorie value of a normal meal. While it is intended as no more than a "snack," tests of the ration in the field indicate that all of the items are likely to be highly acceptable to troops under the stress of battle.

The new packet contains one can of meat, one B-unit, and an accessory unit. It is packed in six menus, each of which has a different kind of meat unit to provide variety. The meat units, packed in tin cans weighing 5½ oz. each, are: Beef and corn, beef and pork loaf, chopped ham and eggs, hamburgers, chicken, and cheese with bacon.

The B-unit, also packed in a tin can, consists of one oatmeal cookie and two round crackers.

The accessory unit, the items of which are packed in a plastic bag, includes one pack of humidity-resistant safety matches; one packet of toilet paper; two sweet bars chocolate or a starch jelly bar; two candy-coated chewing gum tablets; two packets of soluble coffee product of five grams each; two packets of granulated sugar of eight grams each; a folding can opener; a small vial containing 12 water purification tablets; and one packet containing four cigarettes.

Limited quantities of the new food packet, previously procured for field test purposes, already are being dispatched to troops in Korea.

Brooklyn College Offers Food Tech Courses

Three of the six courses comprising a comprehensive round-up in the field of food technology and manufacturing will be offered during the 1950-51 academic year at the Polytechnic Institute of Brooklyn, according to an announcement made by Dr. Raymond E. Kirk, dean of the graduate school.

Under this series, the courses this year will be the "Technology and Chemistry of Economic Poisons", "Food Technology" and "Industrial Fermentation."

The alternate year courses, which will be given in 1951-52, include the "Technology of Dairy Products," "Technology of Food Flavors, Colors and Synthetic Additives," and the

"Technology of Alcoholic Beverages."

Dr. Morris B. Jacobs, chief organic chemist in the research laboratory of the New York City Dept. of Health, has developed this specialized series on the engineering involved in food production since his appointment at the Polytechnic Institute in 1946 as an adjunct professor in the department of chemical engineering. He presents all of the courses with the exception of "Industrial Fermentations" which is given by Professor Earl D. Stewart, also an adjunct professor in the department of chemical engineering.

1951 Wheat Acreage

Secretary of Agriculture Brannan has determined that the 1951 wheat acreage allotment will be the same as the final allotment for 1950—72,800,000 acres. He also revealed that there would be no marketing quotas for '51 wheat.

With average yields the 1951 allotment would result in a wheat crop of 1,150,000,000 bu. This output along with an estimated carryover of 374,000,000 bu. would provide more than 1,500,000,000 bu. for the 1951-52 marketing year.

New FI Publisher

In a shift of publishing assignments following the McGraw-Hill Publishing Co.'s purchase of the magazine *Chemical Industries*, E. D. Fowle was appointed publisher of FOOD INDUSTRIES. Mr. Fowle, who is also publisher of *Textile World*, succeeds Wallace F. Traendly, who will devote his full time to the two chemical publications, *Chemical Engineering* and *Chemical Industries*.

Ed Fowle joined the editorial staff of *Textile World* in 1924, became Associate Editor in 1929. In 1937 he shifted to the advertising staff as the magazine's New England representative, returning to New York as publisher of *Textile World* in 1942.

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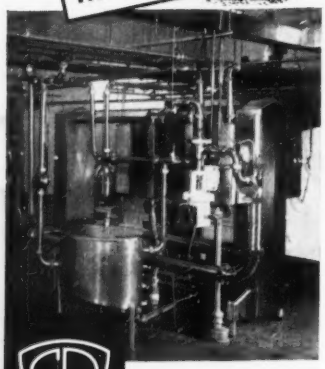

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PLATE HEAT EXCHANGERS

for processing Fruit and Vegetable Juices—Dairy Products—Wine—Beer and other liquid food products.

A *major* advance for lower heat exchange costs and safeguarded product quality! Exclusive CP double-ported plates provide these important advantages! SELF VENTING—air is replaced by liquid the instant the run begins . . . Faster heat exchange, no oxidation. FREE DRAINING—no product loss in change-overs. Quicker cleaning, better sanitation. GENTLE HORIZONTAL FLOW—maintains product quality; prevents excessive turbulence, "dead spots" and pockets. Ask for the facts on CP FULL-FLO Stainless Steel Plate Heat Exchangers.

And for Smaller Plants . . .

CP MULTI-PASS—the compact Heat Exchanger with the *smaller plate* for maximum utility at minimum cost.

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You Gotta Pick One

Suppose you were one of the judges trying to pick one of these Aroostook County young ladies for the title of Maine Potato Blossom Queen. We're not going to help you out by revealing the winner except to add that Norma Collins, of Caribou, is sitting third from the right. We endorse any and all selections. (Wide World)

Meat Product Regulations Deferred To November

Establishing of a minimum meat content requirement for pork and/or beef with barbecue sauce has been deferred until Nov. 1 in order to afford additional time for interested parties to present pertinent information to Bureau of Animal Industries. On April 20 Meat Inspection Div. Memorandum No. 150 was issued with an Aug. 1 effective date. It included minimum levels of 60, 70 and 86 percent for various methods of calculating the meat content. On July 3 this memorandum was supplemented with the revised effective date of Nov. 1. Division chief Miller desired to "hear from all interested parties so that we will have a complete file of information from which a decision can be made."

A number of amendments to the meat inspection regulations were also proposed by a notice appearing on page 4606 of the July 19 *Federal Register*. The purpose of these proposals was announced as "to bring into the regulations orders and instructions that have been given to the field operating force of the Meat Inspection Div. and inspected establishments during the past year, and to incorporate new material controlling the composition of certain meat food products along lines which have been thoroughly investigated by that division."

Limit on the application of curing solutions to such meat cuts as ham, shoulder, etc. is revised by Meat Inspection Div. Memorandum No. 155 issued July 24 to become effective Oct. 1. This ruling requires that curing solution must not be used to give more than 10 percent increase in finished weight over the weight of the fresh meat. It is also provided that the weight of the cured and smoked product not exceed the weight of the fresh uncured article. And furthermore, if materials are marked "sugar-cured" or "honey-cured," the curing solution must contain not less than 1.5 lb. of sugar or 2 lb. of honey respectively.

A fourth division order, Memorandum 516, divides the specific responsibility of inspectors in insuring that denaturants of proper nature and quantity be used to prevent food usage of fat derived from inedible or condemned sources.

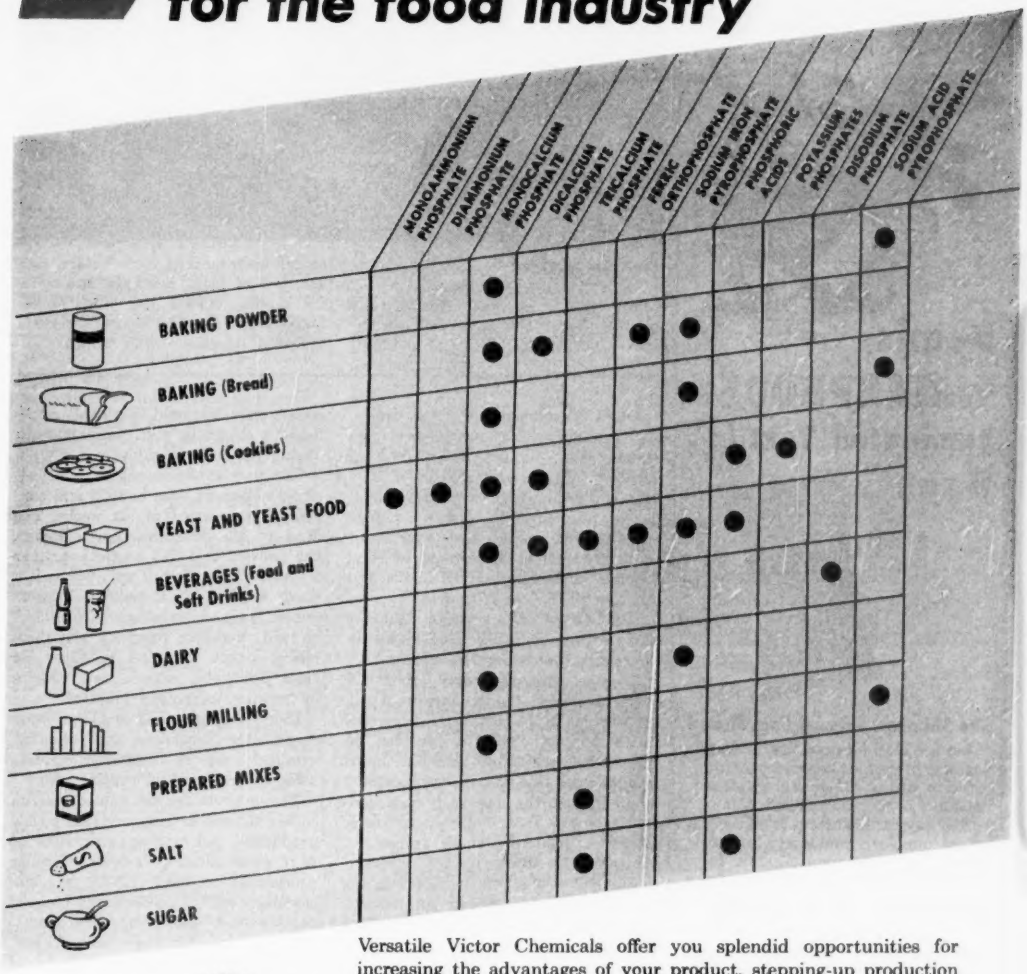
Survey Measures Changes In Orange Marketing

Frozen concentrated orange juice accounted for 19 percent of the total orange and orange product bought during the first quarter of 1950. A year ago frozen orange juice accounted for only five percent.

This information was obtained as a result of studies of household consumer buying practices made by the USDA's Production & Marketing Administration and the Bureau of Agricultural Economics in cooperation with fruit industry groups which bore half the costs of data collection.

Accompanying the increase in purchases of frozen concentrated juice is a reduction in the relative volume of household purchases of fresh oranges and canned single-strength orange juice. Fresh orange purchases ac-

VERSATILE VICTOR CHEMICALS for the food industry



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They are ideal for products needing special protection against contamination, sifting, or loss or absorption of odors or moisture. Bemis Waterproof Bags are resistant to oil, acid, tears, punctures and insect infestation. They're economical, too. Investigate.

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WATERPROOF DEPARTMENT
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MAIL THIS COUPON NOW!

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Send information about Bemis Waterproof Bags for

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(PRODUCT)

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Company_____

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No-Stop Coffee

Crave some coffee while driving? No trouble a'tall. This electrical machine hooks up with the car's generator and holds enough water for three cups of coffee. Can also prepare soups, boil eggs, heat water for shaving. Called the "Iro" Coffee-Maker, it sells for about $10 and is made in Frankfort, Germany. (Wide World)

counted for 62 percent of all orange and orange product purchases (fresh orange basis) in the first quarter of 1949, but in the first quarter of 1950 this had declined to 56 percent. Similarly, purchases of canned orange juice, which in the first quarter of 1949 represented 32 percent of total orange purchases, declined in the first quarter of 1950 to 25 percent.

The survey also revealed that the frozen juice is being handled by an increasing percentage of stores.

Of the stores surveyed, about 17 percent carried the product in April, 24 percent in August, and 31 percent in November, 1949. In contrast, 84 percent of the stores carried canned orange juice in April, 1950. The survey showed that the frozen orange concentrate was least available in stores doing a relatively small volume of business, in stores located in small cities and towns, and in stores in the South. But even among such stores, the percentage carrying the frozen orange concentrate doubled during 1949.

Master Brewers' Course Set by Siebel Institute

The Siebel Institute of Technology, Chicago, recently announced details on the post graduate course in brewing technology, which will be conducted exclusively for master brewers and assistants. This course is part of the Institute's new education policy, announced about two years ago. This policy placed the regular brewers course on a biannual basis and established a course in post graduate work during the intervening year.

The post graduate course is scheduled to open on Jan. 8, 1951 and continue for a period of six weeks. The dean of the Institute, Kurt Becker, has stressed that this course is neither a "review" nor "brush up", nor is it a short version of a regular brewers course. "It is advanced scientific study," he said, "on both practical and theoretical levels, designed to carry on from the point where basic courses in brewing technology leave off."

Heavy emphasis will be placed upon round-table discussions and seminars, presided over by experts in specific fields of brewing and malting.

The subjects for the course will include: Recent developments in barley production and malting; principles of wort production; principles of cellar procedure; selected topics of biochemistry related to brewing; brewery plant control—biological and chemical; bottling and canning; modern concepts of brewing bacteriology; handling of beer from brewery to consumer and dispensing of draught beer; round table discussions and seminars covering special problems encountered today by master brewers that are not specifically covered in the foregoing subjects.

Instruction time will be divided between the classroom, laboratory and informal discussion groups.

Admission to the course is restricted to master brewers, assistant master brewers, technical directors and production superintendents who are cur-

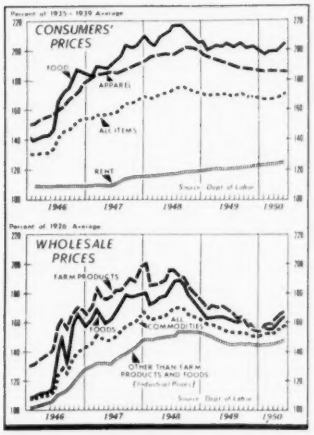
rently active in such positions in breweries. Also required are graduation from a recognized school of brewing (either American or foreign) or the equivalent education secured in an institution of higher learning; minimum of two years' experience as a master brewer or assistant; and high school graduation or its equivalent. In addition, an assistant master brewer will require the personal endorsement of his application by the master brewer under whom he is serving.

Complete information regarding the course may be secured by writing to the Registrar, Siebel Institute of Technology, 741-747 W. Jackson Blvd., Chicago 6.

Jam and Jelly Survey Shows Buying Peaks

Department of Commerce investigators found what appears to be a "consumption plateau" in jams and preserves. According to a progress report on a fruit spread production survey being conducted by the government agency at the request and under the financial sponsorship of the National Preservers Assn., output has been relatively stable in the past three years.

The unreported tentative conclusion is that from now on it will take increased "plugging" to increase con-

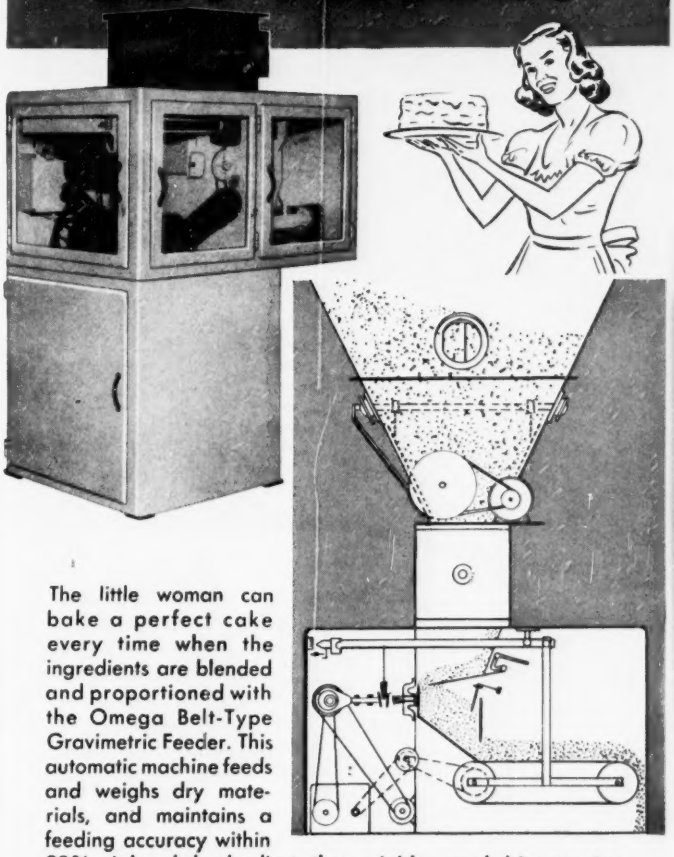


Economic Charts

Department of Labor provided these charts for President Truman's midyear economic message. According to this version food prices have been leading the parade both at the wholesale and retail levels. But don't forget that scarce food items, now in unprecedented demand and price supported commodities are also represented and help pull those lines upward. (Wide World)

For Blending or Proportioning Food Mixes

OMEGA



The little woman can bake a perfect cake every time when the ingredients are blended and proportioned with the Omega Belt-Type Gravimetric Feeder. This automatic machine feeds and weighs dry materials, and maintains a feeding accuracy within 99%. A handwheel adjusts the variable speed drive to give an infinite number of feeding rates over a 100 to 1 range. The Omega Gravimetric is ideal for continuous or batch blending and proportioning such materials as sugar, flour, salt, cocoa, beatrine, powdered milk, magnesium carbonate and leavening mixes. For descriptive bulletin write Omega Machine Company (Division of Builders Iron Foundry), 402 Harris Ave., Providence 1, Rhode Island.

Omega manufactures a complete line of volumetric and gravimetric feeders for dry materials and for gravity feeding of liquids and solutions:

Belt-Type Gravimetric Feeders • Disc Feeders • Loss-in-Weight Gravimetric Feeders Rotodip Solution Feeders • Universal Feeders • Rotolock Feeders • Precision Solution Feeders • Dust Collectors • Bucket Elevators

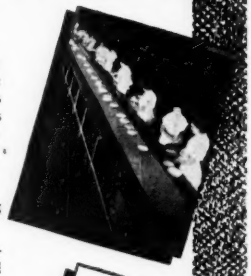
THE LAST WORD IN FEEDERS

OMEGA

Where Can This
MOVING TABLE TOP OF STAINLESS STEEL
...increase YOUR processing efficiency?

Sandvik's Stainless Steel Belt Conveying Work Tables Are Minimizing Costs In Operations Such as Chicken Eviscerating • Bacon Slicing • Frankfurter Packing and Weighing • Hamburger Preparation • Tenderizing • Cake-icing • Cup-cake Icing and Packing • Ham-boning • Pork Rolling Fish Fileting • Vegetable Preparation Potato Chip Distribution, etc.

Here's a way to modernize food handling operations. Sandvik's standard work table units carry your product on a flat, endless band of stainless or carbon steel. Units can be adapted to virtually any application.



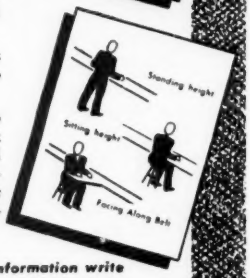
ADVANTAGES

EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly.

NO TASTE CONTAMINATION—A smooth, impermeable surface . . . No place for food particles to lodge.

LONG SERVICE LIFE—Sandvik steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Lengths to meet any center distance. Standard work table widths are 20" and 12" but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available. S5-59



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Conveyor Department
111 Eighth Ave., New York 11, N. Y., WA. 9-7180
Manufacturers Of Steel-Belt Conveyors For Over 30 Years

SANDVIK STEEL BELT CONVEYORS

Baking Leader Dies

M. Lee Marshall, whose sudden death, August 1, deprived the food industry of one of its leading figures, had been Chairman of the Board of the Continental Baking Co. since 1927. He had also served as president of the company from 1933 to 1943. At the time of his death, Mr. Marshall was also serving his term as chairman of the board of the American Bakers Assn. Connected with the baking industry since 1914, Mr. Marshall served the whole food industry and the country during the latter part of the recent war as deputy administrator of the War Food Administration.

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sumption. It also points out that the time is ripe for new, different or improved products to entice the jam and preserve-buying housewife.

Sizeable successive cutbacks in the output of marmalades and fruit butters have been made in the last two years. Jelly production was slightly under 1948 output in 1949 and about 10 percent less than in 1947.

Not enough figures have been collected as yet to estimate 1949 production for jams and jellies. The survey will reveal the public flavor preferences. Preliminary returns indicate that strawberry flavor accounted for 28 percent of all preserves and jams produced in 1949. Grape flavor was the favorite in jellies, constituting 28 percent of output.

Survey data collected will be of value to manufacturers in gauging the market potential of fruit spreads and in measuring implied consumption trends.

Defense Dept. Simplifies Food Specifications

All non-perishable foods hereafter purchased by the Army Quartermaster Corps for supply to the Army, Navy, or Air Force will be procured either

under Federal or Military Specifications.

Up to the present canned, dehydrated, or otherwise rendered or processed foods have been purchased under three types of specifications: Federal, Army, or Quartermaster Tentative. The last-named were largely developed to meet requirements during and since World War II. Perishable foods are bought on the open market under specified standards but not on specifications.

Conversion of non-perishable food items to Federal or Military specifications is in keeping with a unification policy directed by the Munitions Board. Under this program, all materials purchased by every branch and service of the military establishment will eventually be placed under one or the other of these two specification types. This means gradual elimination of Army, Navy, and Air Force specifications, as well as tentative specifications previously prepared by any of the military technical services.

Supply items used both by civilian governmental agencies and the military establishment are covered by federal specifications, while supply items used only by the military establishment will be covered by military specifications.

There are 390 subsistence specifications in use by the Quartermaster Corps of which 250 are in the federal and 140 in the military series.

This is the first group of items covering the entire range of a commodity to be converted under a Department of Defense program calling for standardization of procurement specifications.

Coffee Trees Planted

Mexico, whose place among coffee growing nations has never been high, is planning to get a bigger share of the business.

The National Coffee Growers Commission of Mexico has announced that within the past six months over 5,000,000 new coffee trees have been planted and this rate will be continued in the future. Three Mexican states, Vera Cruz, Chiapas and Oaxaca, all have climates and soils favorable to coffee-growing.

Up Concentrate Capacity

Prospects are that Florida producers of frozen citrus concentrates will increase their capacity by about 60 percent during the next season. Based on surveys it is estimated that expansion of present facilities and new plants to be or under construction will lift the 1950-51 production to 40,000,000 gal.

Meet the BEMIS Small Bag Family

These Bemis Bags belong on your packaging team. Here's why: They fill and pack economically. That helps your costs. They give unbeatable display to your brand. That helps your sales. They are good packages and consumers realize it. And that helps everybody.

Get the full details of the Bemis small bag story. Write or phone your Bemis man today.

A Winner for You

Bemis DELTASEAL Bags (flat-tube) have the exclusive and popular Pull-Cut-Pour Spout. The white coated or bleached paper makes your brand stand out on all sides like a million. The squared shape makes for eye-filling mass displays.

Bemis FLEXI-CARTON — In-tuck bags that square up beautifully and billboard your colorful brand all around. Like Deltaseal, these are economical bags worthy of your good product. A variety of types of closures available.

Bemis CELLOPHANE Bags are increasingly preferred for many foods, chemicals and other products. Cellophane is a showcase for your merchandise. And the brilliant color printing on Bemis Cellophane Bags shouts for attention.

Bemis WINDOW BAGS give you the advantage of Bemis' fine printing on white coated or bleached paper, *plus* the extra sales appeal of the window view of your product. These bags have the Deltaseal construction and the Pull-Cut-Pour Spout

There is a Bemis Plant or Sales Office near you —

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Kansas City • Memphis
Los Angeles • Norfolk
Minneapolis • Mobile
New Orleans • Omaha
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Salt Lake City • Seattle
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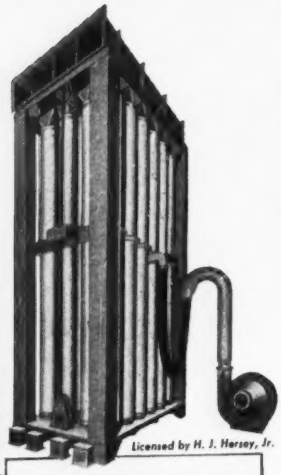
FOOD PROCESSING PLANTS ASSURED

Better Sanitation

WITH A

DAY
Type A.C.
DUST FILTER



Licensed by H. J. Hersey, Jr.

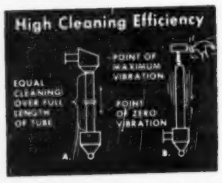
New highs in plant cleanliness are being achieved by food processing plants using **DAY** Type A. C. Dust Filters because all parts have been specially designed for better sanitation.

From inlet to outlet, **DAY** Filters have no flat surfaces or ledges for dust to accumulate and become contaminated. This feature is especially important in food processing where maximum cleanliness and elimination of bacteria are essential.

The **DAY** Filter is engineered to give higher cleaning efficiency and continuous-automatic operation with constant air volumes. The gentle, yet positive continuous cleaning action of reverse air jet rings permits the use of a high grade felt filtering fabric which collects even the finest dust particles. This high grade filtering material also allows greater air-to-cloth ratios. (Actual installations are operating successfully with air-to-cloth ratios of 15 or 20 to 1.)

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¾%. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.

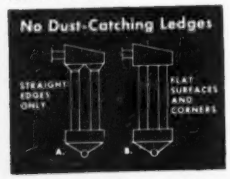
High Cleaning Efficiency



A. In DAY Filters, reverse air jet rings move continuously up and down effectively cleaning the full length of each tube.

B. In filters requiring violent rapping, cleaning effectiveness varies widely from point of vibration to point where cloth is fastened to filter.

No Dust-Catching Ledges



A. DAY Filters have no flat surfaces or ledges where dust can collect and become contaminated.

B. Most other dust filters have flat surfaces and ledges which collect dust and encourage infestation.

OTHER IMPORTANT ADVANTAGES

- **SEPARATED DUST STREAMS**—One **DAY** Type A. C. Filter can handle several different product streams simultaneously *without mixing.*
- **ECONOMICAL**—You save money because you need less filter to handle equal volumes of air. Less floor space required. Simple, rugged construction gives years of dependable operation with minimum maintenance.

Write-to-DAY for Bulletin 491.

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Branch plants in Ft. Worth, Buffalo and Welland, Ont.

as compared with about 25,000,000 gal. in the 1949-50 season.

Polk Packing Assn. will double capacity of its million-gallon plant by rebuilding facilities destroyed by fire last June. Fosgate Growers, Orlando, plans a million-gallon plant to be completed by next Jan. 15. Pasco Packing Co., Dade City, is expanding facilities by 3,000,000 gal. Libby, McNeill and Libby, Ocala, Minute Maid at Leesburg and Sargeant Concentrates, Lakeland, are others expanding facilities.

Adopt Skinning Machine For Fish Fillets

Modern fish-skinning machines have been adopted by several fishery firms for splitting fish fillets to any desired thickness. Advantages claimed are production of more desirable thin sections from thick fillets, the preparation of fillets of uniform thickness, and preparation of extremely thin sections of fillets for use in special recipes.

Adoption of these machines came about from work on rockfish fillets carried out by Fish & Wildlife Service's technological laboratory at Seattle. They recommend removal of most of the dark flesh beneath the skin of the rockfish fillets by setting the skinning machine to remove approximately ⅛ in. of the flesh as well as the skin. This practice about doubles the cold storage life of the frozen rockfish fillets, the service claims.

Brazil's Coffee Exports

Brazilian coffee exports in the first five months of this year fell 31.5 percent below those for the same period of 1949, and Brazilian trade circles are blaming decreasing U. S. purchases for most of the slip.

Nevertheless, the U. S. bought 66 percent of the 6,705,000 bags shipped between January 1 and May 31. Stocks in the various coffee ports were 2,541,000 as of June 1, compared to 3,568,000 on hand as the year opened.

Tuna Imports Rushed

Fears of the American tuna canning industry that Japanese imports were about to duplicate the high tide of 1933 have been partially allayed by announcement of the U. S. tariff jump from 22½ to 45 percent ad valorem on Dec. 31.

The tariff increase—a windfall brought about by joint U. S.-Mexican denunciation of their reciprocal trade treaty—will be big help to domestic producers over the long pull. But it also creates an immediate problem—

the threat that Japan will dump all tuna available into American warehouses before the tariff boost becomes effective. Industry officials realize that Japan could send enough canned tuna to supply the American market for the first half of 1951.

Correction

In the article "Dry Ice Bunkers Fan-Cool Trucks," p. 82 July FI, the average price of dry ice was said to be $.75 per 50-lb. block. This price should have read $1.75.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Dept. of Agriculture on U. S. Grade Standards and related activities include the following:

American cheese, new, proposed, page 4341, July 8 *Federal Register.*

Canned grape juice, revised, proposed, page 4917, August 1 *Federal Register.*

Canned cranberry sauce, new, proposed, page 4949, August 2 *Federal Register.*

Brussels sprouts, new, page 4631, July 20 *Federal Register,* effective August 19.

Fresh kale, new, page 4781, July 27 *Federal Register,* effective August 26.

Apples (two standards) (1) U. S. Standards, second revision, proposed, page 4950, August 2 *Federal Register.* (2) U. S. Consumer Standards, new, proposed, page 4953, August 2 *Federal Register.*

F&DA Food Standards

Status of food standards program of Food and Drug Administration in early August is reviewed below.

Future Hearings

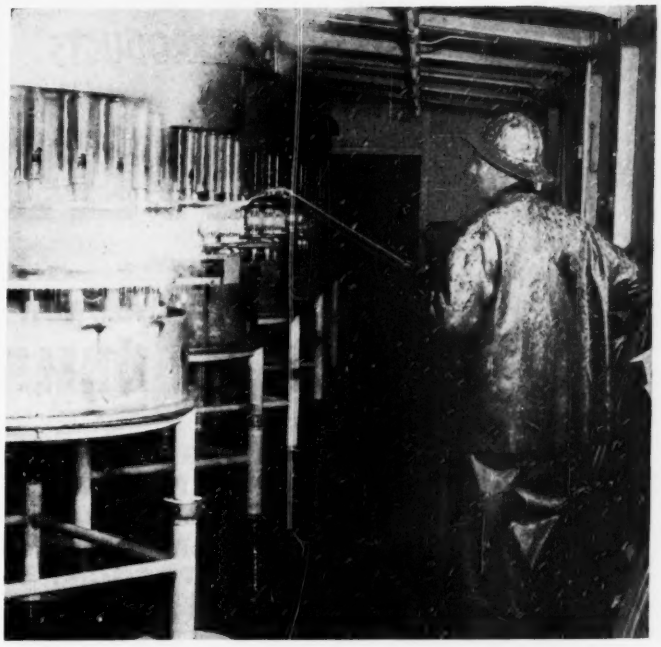
1. *Preserves.* Amendment, requested by industry, announcement expected soon.

2. *Ice cream.* New, resumption of prewar hearing, scheduled for Nov. 13, 1950. Announcement on page 5112 of August 8 *Federal Register.*

3. *Canned pineapple and canned pineapple juice.* New, originally announced for October 1950, this hearing was postponed in April at the request of Pineapple Research Institute of Hawaii until Oct. 15, 1951.

Hearings in Progress

1. *Residue tolerances.* Continued discussion of specific chemical toxicities until mid-August. After a recess until Sept. 11, hearing expected to adjourn mid-September.



NO TWO DAYS ABOUT IT!

IT often took a crew two days and more for the manual task of cleaning juice extractors like those. Now it's only a matter of minutes before soils are forced to make a quick exit, leaving equipment clean, really clean!

What makes the big difference? The potent detergency of a selected Oakite cleaning material mixed in an Oakite Steam Gun with steam heat ... then pressure-sprayed on surfaces. That's what saves your time!

It does such a good job in so little time that you're probably thinking of it as a way of simplifying other work. Cleaning conveyor chains, for example, tables, peelers, sorters, tubs, sealers. It's a natural for all those ... and paint stripping, too!

But Oakite Steam-Detergent Cleaning is only one of the many modern Oakite developments designed to help you get more effective, economical cleaning and sanitation. Among others are more than 80 cleaning materials to meet every soil condition, water hardness, equipment design. There are materials to remove animal fat, vegetable and fruit residues ... take off lime scale, rust and stain. Others for odorless deodorization, bacteria control, water softening. And more.

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Pelleted products are easier to handle, easier to merchandise, easier to sell. They have less competition, bring a higher price – step up profits.

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Tentative Orders Awaited

1. *Frozen fruits.* Long awaited; hearing adjourned in July 1948, briefs filed in October 1948.

2. *Canned mushrooms* (amendment). Expected soon; hearing adjourned in June, briefs filed in July.

Final Orders Awaited

1. *Cheeses.* Long awaited; tentative order published in April 1949.

2. *Salad dressings.* Long awaited; tentative order published in November 1949.

3. *Canned corn.* Expected soon; tentative order published in April 1950.

4. *Bread.* Tentative order issued, pages 5102 August 8 *Federal Register*. Exceptions may be filed until Sept. 7, 1950. (See separate story this issue.)

Standards Completed

None since last reported (FOOD INDUSTRIES, August 1950, page 140).

Schedule of Events

September

5–9—American Chemical Society, Chicago Section, 6th national chemical exposition; Coliseum, Chicago.

10–13—National Frozen Food Locker Assn. and Frozen Food Locker Institute, joint convention; Palmer House, Chicago.

17–19—Southern Bakers' Assn., exposition and production conference; Municipal Auditorium, Atlanta, Ga.

23–26—Packaging Machinery Manufacturers Institute, 18th annual meeting; The Homestead, Hot Springs, Va.

29–Oct. 3—American Meat Institute, 45th annual meeting; Palmer House, Chicago.

October

1–4—Tea Assn. Convention; Greenbriar, White Sulphur Springs, Va.

5–14—National Macaroni Week.

13–18—American Bakers' Assn. annual convention; Hotel Sherman, Chicago.

15–18—International Assn. of Milk and Food Sanitarians, Inc., annual convention; Hotel Dennis, Atlantic City, N. J.

16–21—Milk Industry Federation and Dairy Industry Supply Assn., 43rd annual convention and 17th exposition; auditorium, Atlantic City, N. J.

18–20—International Assn. of Ice Cream Mfg., 46th annual convention; Auditorium, Atlantic City.

23–25—Packaging Institute, 12th annual forum; Hotel Commodore, New York City.

25–27—National Assn. of Popcorn Mfgrs., 6th annual convention and exposition; Stevens Hotel, Chicago.

23–28—National Honey Week.

November

13–15—Grocery Mfgrs. of America, annual convention; Waldorf-Astoria, New York City.

15–17—Texas Technological College, 2nd annual dairy manufacturers short course, Lubbock, Tex.

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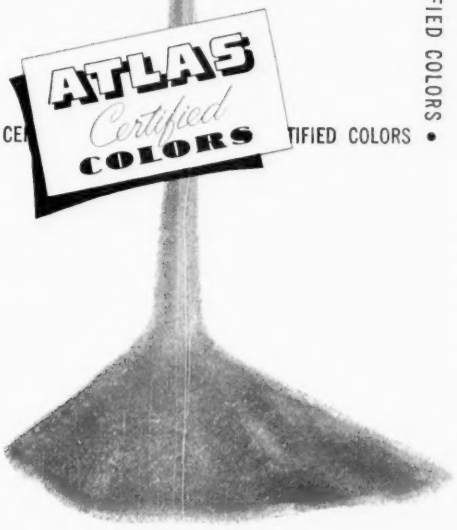

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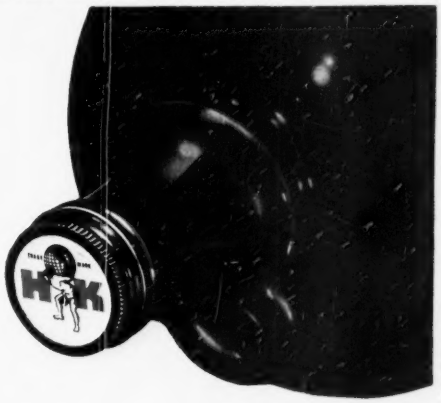

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Your candy, your ice cream, your beverage—in fact any food product has a running start on competition if you give them exactly the *right* colors and the *right* flavors.

Quality manufacturers who know the importance of both eye and taste appeal have been relying on H. Kohnstamm's color and flavor experts for up to 100 years. If you're not already enjoying the benefits of this time-tested combination to help sell your products, *let's get acquainted now.*

We're equipped to take care of your regular requirements . . . or we can create colors or flavors to your individual specifications. For information, counsel, samples, or a trial order, write the H. Kohnstamm headquarters nearest you.

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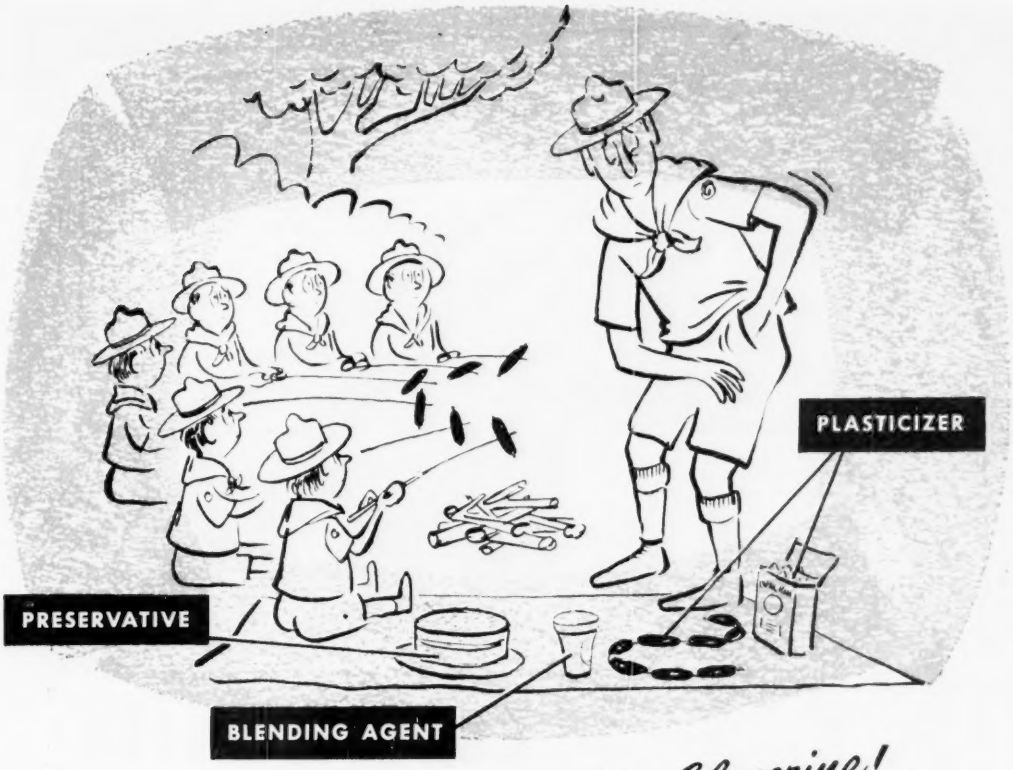

One item you can't forget—Glycerine!

TODAY—versatile Glycerine crops up again and again as an ingredient in a variety of food staples, candies, ice cream and beverages! Because it is *absolutely safe to use*, and actually wholesome and nutritious—it has become a standard sweetener, humectant, solvent, preservative and blending agent in innumerable food products. Are you sure you're familiar with the prominent role Glycerine plays in food processing? The numerous applications listed in "*Why Glycerine for Foods?*" may surprise you! Why not write for a free copy?

TOMORROW—Glycerine will be widely used in food packaging as well—and its proven non-toxicity has already rendered it an invaluable adjunct in the manufacture of food wrappings and sausage casings. Its possibilities in improving the appearance and palatability of dried fruits is indicated by a patent which has recently come into public domain. The process consists essentially of spraying or immersing the fruit in glycerine or an aqueous solution thereof which is said to retard drying out and crystallization in storage. Full details will be sent on request.

Nothing takes the place of Glycerine

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue, New York 17, N. Y.

PLEASE SEND A COPY OF
"WHY *Glycerine for Foods?*" ☐ 8

Please send further information on dried fruit process ☐

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

STAINLESS STEEL MECHANICAL AND PRESSURE TUBING

These are common sizes. Intermediate sizes, larger or smaller diameters, heavier or lighter walls, or geometric shapes other than round also are available.

OUTSIDE DIAMETER	GAUGE RANGE	OUTSIDE DIAMETER	GAUGE RANGE
3/8"	16-25	1-11/16"	10-20
7/16"	16-25	1-3/4"	10-20
1/2"	14-25	1-7/8"	10-20
9/16"	14-25	2"	9-20
5/8"	14-24	2-1/8"	9-20
11/16"	14-24	2-1/4"	9-20
3/4"	13-24	2-3/8"	8-20
13/16"	13-24	2-1/2"	8-20
7/8"	12-23	2-5/8"	8-20
15/16"	12-23	2-3/4"	8-20
1"	11-23	2-7/8"	8-20
1-1/16"	11-22	3"	8-20
1-1/8"	11-22	3-1/4"	8-16
1-3/16"	11-22	3-1/2"	8-16
1-1/4"	11-22	3-3/4"	8-16
1-5/16"	11-20	4"	8-16
1-3/8"	11-20	4-1/4"	8-16
1-7/16"	11-20	4-1/2"	8-16
1-1/2"	10-20	4-3/4"	8-16
1-9/16"	10-20	5"	8-16
1-5/8"	10-20		

The above sizes are available in types 304, 309S, 310, 316, 317, 321, 347 and 430. Type 302 is available in a limited range of sizes for ornamental use.

STAINLESS STEEL PIPE

NOMINAL PIPE SIZE	OUTSIDE DIAMETER	SCHEDULE 40S STANDARD PIPE WALL THICKNESS	SCHEDULE 10S LIGHT WALL PIPE WALL THICKNESS
1/8"	.405	.068	.049
1/4"	.540	.088	.065
3/8"	.675	.091	.065
1/2"	.840	.109	.083
3/4"	1.050	.113	.083
1"	1.315	.133	.109
1-1/4"	1.660	.140	.109
1-1/2"	1.900	.145	.109
2"	2.375	.154	.109
2-1/2"	2.875	—	.120
3"	3.500	—	.120
3-1/2"	4.000	—	.120
4"	4.500	—	.120

The above Pipe Sizes are available in the Chrome-Nickel analyses of Republic ENDURO Stainless Steel.

ELECTRUNITE

Stainless Steel Tubing and Pipe

● NOW . . . up to and including 5" O.D. . . . ELECTRUNITE Tubing made of time-tested Republic ENDURO* Stainless Steel.

In 1947, the ELECTRUNITE Size Range was expanded to include the pipe sizes listed at the left. Today, Steel and Tubes keeps pace with your expanded requirements by offering a complete range of stainless steel tubing sizes produced by the continuous welding method.

Republic—world's largest producer of stainless and alloy steels—offers you prompt metallurgical assistance with any problem involving the use of stainless steel tubing or pipe. Write, wire or phone *today* for further information.

* Reg. U. S. Pat. Off.

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STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Dept.: Chrysler Bldg., New York 17, N. Y.

Republic
REPUBLIC STEEL
ELECTRUNITE
STAINLESS STEEL TUBING AND PIPE

Changes in Food Supplies

Production

CREAMERY BUTTER produced during June rose to an estimated 166,275,000 lb., a 6 percent increase over May. This was in contrast to a contra-seasonal decline of 2 percent a year ago, and an average May-June gain of 4 percent over the five-year 1944-48 period. Output was also 6 percent larger than in June, 1949 and was 9 percent above the five-year average for the month.

ICE CREAM turned out in June, estimated at 62,550,000 gal., represented a 14 percent increase over May, compared to a May-June gain of 18 percent last year and a five-year average increase of 19 percent. Production was 6 percent under June, 1949, and 3 percent less than the five-year average for the month.

AMERICAN CHEESE output reached the second highest June total on record with an estimated 114,705,000 lb. The May-June increase was 10 percent, compared with a 3 percent decline a year ago and five-year average May-June increase of 5 percent. Production was 2 percent above June, 1949 and 6 percent above the five-year average for the month.

EVAPORATED WHOLE MILK output in June, totaled at 348,800,000 lb. Although about 2,000,000 lb. above May, it was still the lowest for the month during the past decade. Production was down 1 percent from June, 1949 and down 18 percent from the five-year average.

CANNED CONDENSED WHOLE MILK production for June was down to 5,300,000 lb., 46 percent under June, 1949 and 62 percent below the five-year average for the month. Production in the first six months of 1950 was about half that during the same months a year ago.

FROZEN EGGS produced in June were down to 29,374,000 lb., a 41 percent decline from June, 1949, and a 47 percent drop from the five-year June average of 55,497,000 lb.

NONFAT DRY MILK SOLIDS turned out in June showed a seasonal gain from the previous month for the first time since 1947. Most of the gain was made with spray-dried, which reached 75,000,000 lb., up 7 percent from June, 1949 and 68 percent from the five-year average. But roller-dried was up also, reaching 43,750,000 lb., a 4 percent increase from a year earlier. Roller-dried, however, was 3 percent under the five-year average for the month.

POULTRY canned or used in canning during June came to 13,196,000 lb., 9 percent under June, 1949, but 16 percent above the five-year June average. During the first half of 1950, canned poultry was about 13 percent greater than the same 1949 period.

Stocks

Canned Fruits and Vegetables in canners' hands July 1, compared with same date a year ago, were reported by the National Canners Association as follows:

	(000 omitted) Actual Cases	
	1949	1950
Sweet corn	4,956	8,294
Tomatoes	2,719	1,868
Tomato juice	5,741	3,004
Tomato catsup	6,346	2,303
Chili sauce	1,037	432
Green and wax beans	329	1,620
Beets	65	830
Carrots	719	529
Pumpkin and squash	1,047	123
	(Dozens)	
Baby food	41,792	43,253

Storage

FROZEN FISH and SHELLFISH held in storage July 1, totaled 116,896,513 lb., compared with 95,888,602 lb. held June 1, and 114,031,029 lb. held July 1, 1949.

PUBLIC COOLER occupancy was up 4 points from a month earlier, standing at 60 percent on July 1. This 4 point rise compares with a five-year average gain of 2 points for the period. Although still below average, the 60 percent occupancy was 8 points above the level on July 1, 1949.

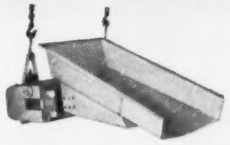
FREEZER occupancy reached 69 percent on July 1, a gain of 5 points during the month. This was 4 points below average, but 8 points above the same date a year ago.

Indexes

Business Week's index of business activity rose to 220.7 for the week ending Aug. 12, compared with 219.8 for the previous week, 215.8 a month earlier, and 182.0 a year ago.

THE COMMODITY INDEX on foods, compiled by the *New York Journal of Commerce*, stood at 190.9 for the week ending Aug. 18. For the previous week it was 190.6, for July, 190.4, and for August 1949, 183.0.

SYNTRON
"Vibra-Flow"
VIBRATORY FEEDERS
With Variable Control of Flow



A RELIABLE FLOW OF BULK MATERIALS
means
Faster Processing At Reduced Costs

WILL HANDLE—most all types of bulk materials—from light, fine powders to heavy, coarse lumps—hot or cold—dry or damp.

AT—variably controlled rates from pounds to hundred of tons per hour—from 110, 220 or 440 volt, 50 or 60 cycle.

TO—crushers, screens, belt conveyors, mixers, blenders, packaging machines, driers, ovens, etc.

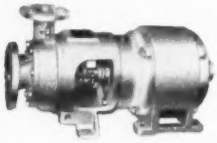
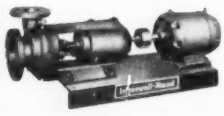
ANOTHER ON-THE-JOB REPORT

HERE'S HOW a bakery increased the efficiency of their vanilla wafer packaging operation by applying three Syntron F-O Vibratory Feeders. Calibrating each feeder with fingertip, rheostat control (standard on all models) to feed at identical rates made possible the filling of three packages at the same time. All three feeders are instantaneously stopped or started by a foot treadle switch. This Syntron application speeded up and reduced the cost of the operation.

SYNTRON CO.
460 Lexington Ave. Homer City, Pa

Do you need a SPECIAL PUMP?

No matter how special your requirements, you may get exactly what you want, from ¼ to 40 hp, from this complete line of Ingersoll-Rand Motorpumps:

	HEAVY DUTY	STANDARD DUTY		MODIFICATIONS
 MOTORPUMPS	Single Stage 10 to 1800 gpm Heads to 240 ft. Two Stage 20 to 275 gpm Heads to 500 ft.	Single Stage 5 to 250 gpm Heads to 175 ft. Two Stage 5 to 55 gpm Heads to 300 ft. Four Stage 5 to 50 gpm Heads 300 to 600 ft.	Can be supplied with any desired type of direct-connected motor – single or polyphase, a-c or d-c; open, splash-proof, totally enclosed fan cooled, explosion proof or marine type.	Open impellers for handling liquids containing suspended material are available on most sizes of Motorpumps and Cradle-Mounted Pumps. To avoid leakage under unusual conditions, Cameron mechanical shaft seals, smothering type glands, or Merco - Nordstrom grease seals can be supplied. Casings and impellers can be built of special materials where required.
 CRADLE-MOUNTED PUMPS	Single Stage 10 to 1800 gpm Heads to 240 ft. Two Stage 20 to 275 gpm Heads to 500 ft.	Single Stage 5 to 250 gpm Heads to 175 ft. Two Stage 5 to 55 gpm Heads to 300 ft.	Can be supplied with any type of motor (as above) – direct-coupled, gear driven, or V-belt driven. Also available with steam turbine or gasoline engine drive.	
CIRCULATING AND COOLANT PUMPS	Single Stage 5 to 150 gpm Heads to 125 ft.		Available in three types; 1) Immersion type (pump submerged in liquid) 2) External type, with side-wall mounting bracket 3) External type with bracket for horizontal mounting	
TURBINE-DRIVEN PUMPS	Single Stage 5 to 1800 gpm Heads to 240 ft. Two Stage 5 to 275 gpm Heads to 500 ft. Four Stage 5 to 50 gpm Heads 300 to 600 ft.		Centrifugal pump element same as in Motorpumps – but direct-connected to a velocity stage, impulse type, steam turbine. Particularly applicable to refinery, process and gas plant service.	

These standard I-R Motorpumps are available for prompt delivery – from the factory, or from nearby District Office stocks. Even your so-called "special" requirements can be met quickly from our complete line of standard pump parts. Whatever your pump problem, your nearest I-R representative is qualified to give you expert assistance.

THE CAMERON MOTOR PUMP
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COMPRESSORS · AIR TOOLS · ROCK DRILLS · TURBO BLOWERS · CONDENSERS · CENTRIFUGAL PUMPS · OIL AND GAS ENGINES

Men, Jobs, Companies

CURTIS H. GAGER

CHARLES MORTIMER, JR.

WILLIAM M. ROBBINS

B. C. OLNEY

Topside Changes Made at GF

General Foods Corp. has announced the following realignment of top company executives: Curtis H. Gager, director and vice-president, assumes operating responsibilities for Franklin Baker, Maxwell House, Associated Products, ElectriCooker and General Foods, Ltd. This is in addition to his previous duties as head of Post Cereals, Igleheart Bros., Gaines Dog Food, Corn Mill, Walter Baker Chocolate & Cocoa, and Diamond Crystal-Colonial Salt divisions. Charles G. Mortimer, Jr., director and vice-president of marketing, assumes operating responsibilities for Birds Eye-Snider, Seafoods, and Bireley's divisions. William M. Robbins, director and vice-president, will coordinate the following staff functions: Treasurer, controller, law, purchasing, export, research and development, in addition to his present heading of operations for Alfred Bird & Son. B. C. Olney, vice-president, becomes assistant to chairman of board and to president. In an earlier appointment, Edward J. Walsh was named director in charge of personnel administration, succeeding Thomas G. Spates. Alfred Christie succeeds Walsh as personnel manager for the general offices.

Industry

American Management Assn. has elected Robert D. Handley chairman of the Exhibitors' Advisory Committee for the 1951 National Packaging Exposition, to be held April 17-20 in Atlantic City, N. J. He is advertising manager, Sylvania Div., American Viscose Corp.

Baldwin Oil Mills, Inc., is constructing a $300,000 soybean processing plant at Foley, Ala. Daily capacity planned is 50,000 bu.

Barricini Candy Shops is expanding its Long Island City plant at a cost of $1,000,000. Addition is expected to be completed this fall.

Braun Bros. Packing Co., Troy, Ohio, has begun construction on a $1,200,000 packing plant for slaughtering and processing of cattle, hogs, veal and lamb. New plant will handle over a million pounds per week.

Cider Vinegar Institute, recently formed, has elected the following officers: Oscar A. Richter, A. M. Richter Sons Co., President; Charles M. Kemper, Speas Co., Vice-President; Grover C. Steffen, M. Steffen Co., Inc., Treasurer; and Paul M. Johnson, Alton Vinegar Co., and J. A. Rowse, New England Vinegar Works, Directors.

Clinton Foods, Inc., New York, has added 1,100 acres to its Florida citrus grove holdings.

General Foods Corp. officially opened its Maxwell House plant at San Leandro, Calif., on July 14. Built to replace similar Los Angeles facility, new plant will produce coffee and Jell-O dessert products.

Kinnett Dairies, Inc., Columbus, Ga., has purchased the Wells Ice Cream Co., Albany, Ga.

Kraft Foods, Ltd., is constructing a $250,000 plant in Vancouver, B. C., for processing salad dressing and margarine, and for warehousing.

Minute Maid Corp. announces a new coin-operated machine to automatically dispense a cup of orange juice for 10c. Tests conducted with 50 machines are reported to have produced very promising results. Company has also just signed an agreement with the Seneca Grape Juice Corp., Dundee, N. Y., to market latter firm's entire grape juice pack as fresh frozen grape juice concentrate.

National Biscuit Co. recently revealed plans for construction of an $8,000,000 cracker baking plant in Chicago. Unit reportedly will turn out 3,000,000 crackers daily.

National Macaroni Manufacturers Assn. has elected its 1950-51 officers as follows: C. Frederick Mueller, C. F. Mueller Co., President; Peter La Rosa, V. La Rosa & Sons, 1st Vice-President; Lloyd E. Skinner, Skinner Mfg. Co., 2nd Vice-President; Maurice L. Ryan., Quality Macaroni Co., 3rd Vice-President; C. L. Norris, The Creamette Co., Advisor; M. J. Donna, Secretary Emeritus; R. M. Green, Palatine, Ill., Secretary-Treasurer; and B. R. Jacobs, Washington, D. C., Director of Research.

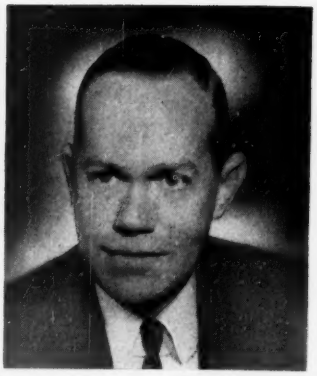
Oscar Mayer & Co., Chicago, has leased plant of former Double "O" Sausage Corp. to begin manufacture of cervelat, thuringer, hard salami, and other specialty sausages. Robert Bolz is manager.

The Refrigeration Research Foundation will hold its 11th regional training conference at Robert Treat Hotel, Newark, N. J., Sept. 18-21.

Sophie Mae Candy Co., Irvington, N. J., plans a $150,000 factory in

DC
ANTIFOAM
A
the most versatile
and efficient defoamer
on the market
A DOW CORNING SILICONE PRODUCT
Dow Corning
MIDLAND · MICHIGAN
Write Dept. H today for free sample.

Dutton
BOILERS
SINCE 1880
AUTOMATIC PACKAGED UNIT
"ECONOTHERM"
OIL OR GAS FIRED
Self-contained unit, shipped complete with all equipment necessary for low cost installation. Exclusive features assure low fuel and maintenance cost. Write for catalog.
Nation-Wide Sales & Service Engineer Organization
THE DUTTON BOILER DIVISION
Hapman-Dutton Co.
HOT WATER AND STEAM GENERATORS FOR HEATING, PROCESSING OR POWER
730 Gibson St. Kalamazoo, Mich.



EDWARD B. NITCHIE has been appointed director of manufacturing of Durkee Famous Foods Div., The Glidden Co., Cleveland. Formerly an executive assistant, he joined firm in 1940. He graduated from Sheffield Scientific School of Yale University.

Atlanta, Ga., to specialize in processing Georgia peanuts.

Southern Dairies, Inc., Washington, D. C., a subsidiary of National Dairy Products Corp., is building a $1,250,000 plant in Winston-Salem, N. C. Completion is expected by next year.

Swift & Co. is constructing a poultry dressing plant at Jasper, Ind. It will have a killing capacity of 2,500 chickens per hour.

The Ward Baking Co. has taken over operation of the Betsy Ross Bakery in New Orleans.

Personnel

Harvey A. Baum has been elected president of the Atlantic Commission Co., produce-buying affiliate of A. & P. He succeeds the late David T. Bofinger, Sr.

Edwin L. Brunken has become a sanitarian with sanitation department of the American Institute of Baking.

C. M. Coulter, formerly with Overland Candy Co. Div., Leaf Brands, Inc., recently joined production staff of Cook Chocolate Co.

Lee Dismuke, former purchasing agent of Georgia Packing Co., has been chosen general manager of new Roberts Packing Co., Jacksonville, Fla.

Frank C. Elliott, formerly associated with Henry W. Peabody & Co., Inc., Seattle, has been named food planning specialist in the Production Office of the National Security Resources Board. An authority on production and marketing of canned and other processed foods, he has been in the food industry since 1912.

Wilbur F. Malin has been elected vice-president in charge of production of Haxton Foods, Inc., Oakfield, N. Y. Other promotions include William V. Bindnagle to executive vice-president and William J. Foreman to vice-president in charge of sales.

Charles E. Martin, Jr., has been appointed manager of southern and southwestern divisions of Illinois Meat Co.

Samuel F. Miller has been named general manager of Pompeian Olive Oil Corp., Baltimore. He succeeds Louis A. Pelton.

W. L. Rainey, formerly chief chemist of Commander-Larabee Milling Co., Minneapolis, has been promoted to vice-president and technical director.

Associated Industry

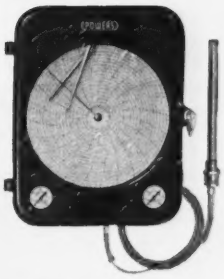
Bemis Bros. Bag Co., St. Louis, has granted two fellowships for study of its company organization and operation. Grants are part of a national program designed to encourage an exchange of information between college staff members and businessmen.

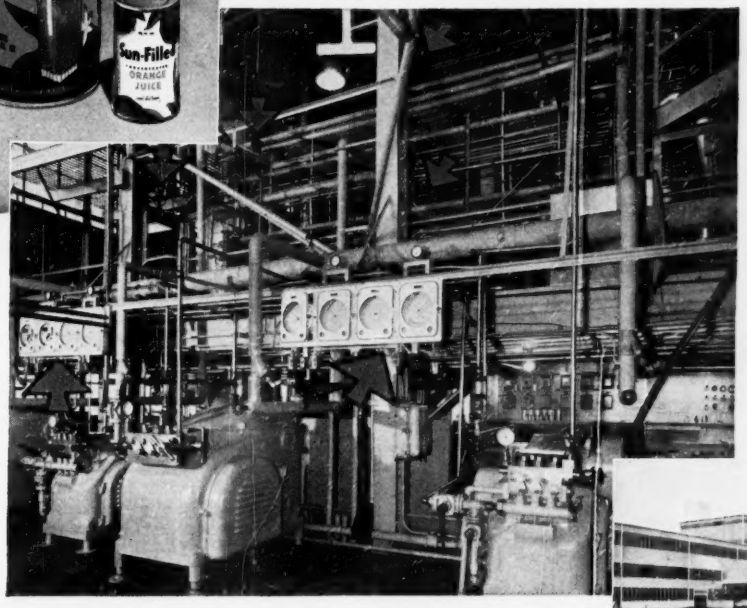
Dodge & Olcott, Inc., New York, has appointed Paul N. Sperry sales man-

---

OLIVER O. SMAHA, formerly president of Chicago Milk Div., Borden Co., has been appointed chairman of Chicago Central Div., succeeding C. L. Dressel, retired. Mr. Smaha will have charge of all Borden fluid milk and ice cream operations in Chicago.

Illustration below shows 8 of the Powers Recording Regulators controlling eight diaphragm valves regulating temperature of orange juice concentrate being processed by SKINNER Mallorizer. At right: Powers Series 100 Recording Regulator.





Above: Powers No. 252 Pressure Indicating Regulator

Powers Flowrite Control Valve

Quality control

in JUICE INDUSTRIES (Div. of Clinton Foods, Inc.) Modern Plant at Dunedin, Florida

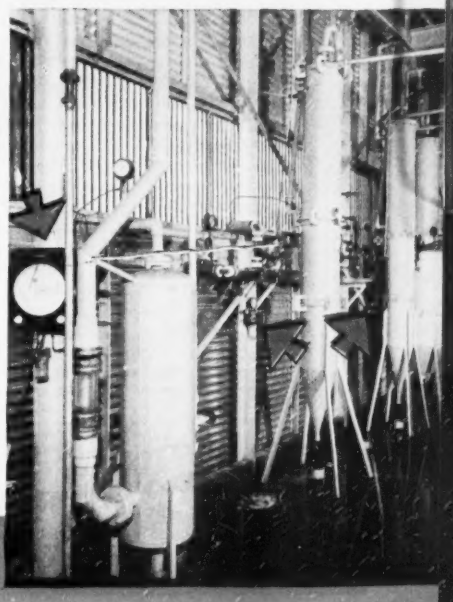
Increases soaring demand for their products

POWERS *Recording* **TEMPERATURE REGULATORS**

. . . controlling the SKINNER Mallorizer (above) and De-Oiler (at right) play their part in helping to maintain the uniformly fine flavor for which JUICE INDUSTRIES products are famous.

Whenever the quality of your products and your *profits* are are affected by accurate, uniform temperature regulation . . . consider POWERS. With almost 60 years experience and a wide variety of pneumatic and self-operated controls we may be able to help you select the best equipment for your requirements. If you have a problem of temperature or humidity control contact your nearest POWERS office or write—

(No. SC)

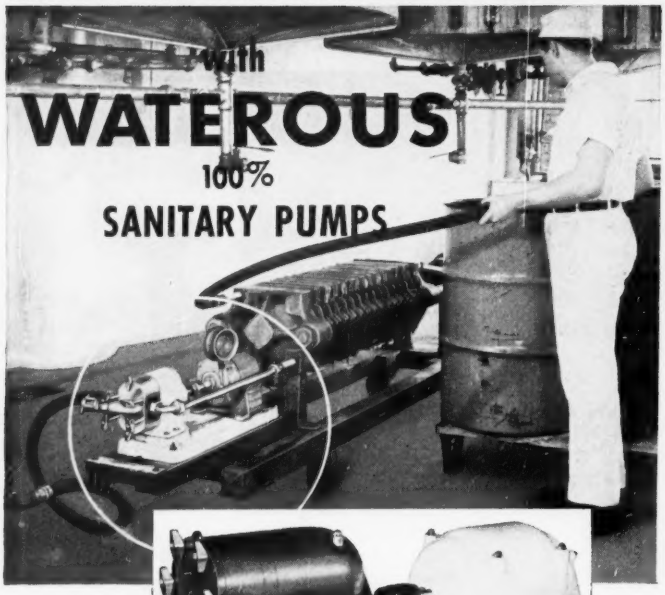


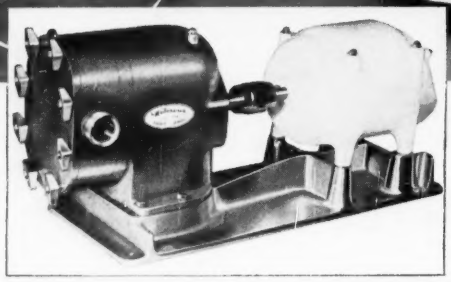
THE POWERS REGULATOR CO.

Over 55 Years of Pneumatic Temperature Control • Offices in Over 50 Cities • See Your Phone Book

CHICAGO 14, ILL., 2793 Greenview Ave. • NEW YORK 17, N. Y., 231 E. 46th St. • LOS ANGELES 8, CALIF., 1808 W. 8th St. • TORONTO, ONT., 195 Spadina Ave.

REPLACE TROUBLESOME PUMPS NOW





Pat. Pending

WATEROUS 100% Sanitary Pump on Filter Press handling syrups containing Filter Aid.

"Rush" seasons are over for many food processors. Now it is time to check equipment . . . especially worn out or troublesome pumps . . . and replace before the next "rush" run. The trend of the industry is to get rid of old-style pumps and install modern stainless steel pumps. In many food processing plants modernization or expansion is being planned and many new stainless steel Sanitary Pumps will be needed. It will pay you well to install WATEROUS 100% Sanitary Pumps because you'll get accurate volume control with flow settings that remain constant . . . built-in gear reduction unit . . . one piece rotor and shaft with *no threads contacting the product* . . . easy flushing self draining seals . . . type 316 stainless steel for *all* wetted metal parts, and many other advanced pump design features. You eliminate product "plugs", and messy leaks and drippage with unique mechanical seals. WATEROUS 100% Sanitary Pumps meet ALL 3A Standards in spirit as well as in fact!

Plan now . . . to make your next rotary pump a WATEROUS. Order today . . . or put it in your budget for next year. Write today for complete engineering recommendations and prices.

Get your copy of the new WATEROUS Sanitary Pump Bulletin P-332 today.

Waterous
DEPENDABLE PUMPS SINCE 1886

WATEROUS COMPANY
80 EAST FILLMORE AVE.
ST. PAUL 1, MINNESOTA

BERNARD TEMTE has been named plant manager of Bunte Bros., Chicago confectioner. Formerly, he was an industrial engineer for Quaker Oats Co.

ager, and Arthur L. Dowling as advertising and sales promotion manager.

Kold-Hold Mfg. Co., Lansing, Mich., has appointed C. H. Boyd, Atlanta, as direct factory representative in southeastern and midsouthern territory.

National Technical Laboratories has changed its corporate name to Beckman Instruments, Inc. The action was taken to better asociate the corporate name with the trademark of the principal products.

Van Ameringen-Haebler, Inc., New York, has appointed Paul Orsay to its flavor sales staff.

Deaths

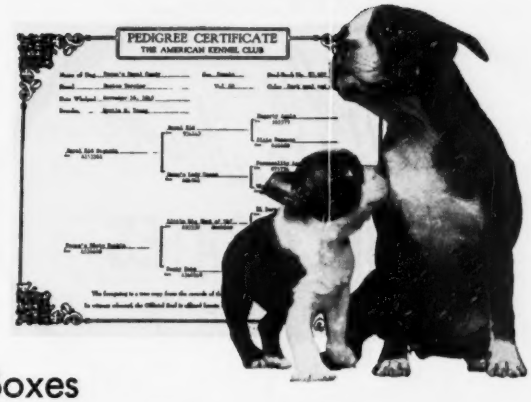
William C. Bainbridge, 67, pioneer in the development of certified colors for use in foods, associated with H. Kohnstamm & Co., New York—July 6.

Thomas J. Grace, sales manager of Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass., and long known in the fisheries field—July 12.

Charles S. Jacobowitz, 72, famed as "brewery undertaker" during prohibition, and lately president of the Niagara Filter Corp. and Speedways Conveyors, Inc., both of Buffalo—June 20.

Charles E. Martin, 73, general sales manager of Illinois Meat Co. and former president of National Meat Canners' Assn.—June 8.

Gari M. Stroh, 58, president of Stroh Brewery Co., Detroit—June 26.—*End*



The Boston Terrier was bred in Boston about sixty years ago from English Bulldog and white English Terrier stock. This little fellow is exceptionally lively and bright, and truly deserves the title of "American Gentleman."

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Look First for the Pedigree

MAKERS of famous brand-name products cannot afford to gamble on corrugated containers. They must have a box that will carry their product safely from factory to dealers' shelves all over America.

That is why Stokely-Van Camp pack Stokely's Finest canned vegetables, dinner table favorites of millions, in Union boxes—the boxes with a pedigree.

75 years of leadership in kraft packaging stands behind Union boxes. Every step in the making, from timber to finished box, is quality-controlled by one management in America's largest pulp-to-container plant.

Vast forest resources, four of the most modern corrugating plants, and five of the nine largest paper machines in the world are your assurance of consistent quality, dependable service and fair price, today and in the future.

That's why, every month, more famous national-brand products are shipped in Union boxes.

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Dependable Packaging
Since 1872

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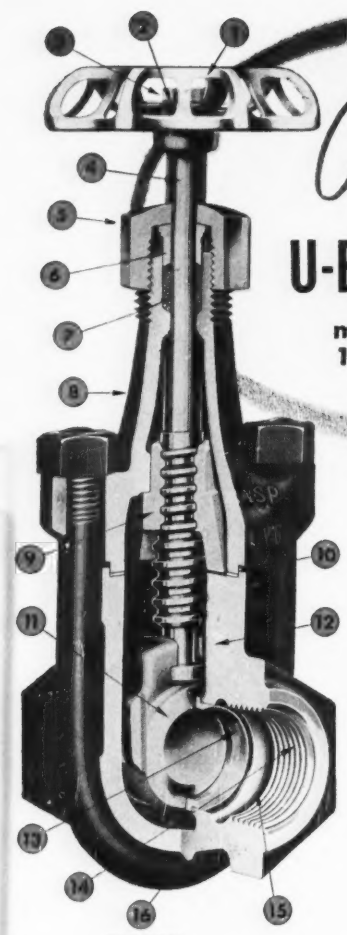
UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: **SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**



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measure up to this 16-point standard

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3. Secure Wheel Nut
4. Heavy Manganese Bronze Spindle
5. Large Packing Nut
6. Self-centering Packing Gland
7. Deep Stuffing Box
8. Heavy Duty Bonnet
9. Unique Renewable Bonnet-Saver Bushing
10. Body-Bonnet Safety Joint
11. Extra-Wide Gauge Reversible Bronze Wedge
12. Heavy-Duty Body
13. Bronze Seat Rings, Expanded in
14. Full Length Pipe Threads
15. Liberal Diaphragm Clearance
16. Strong U-Bolt

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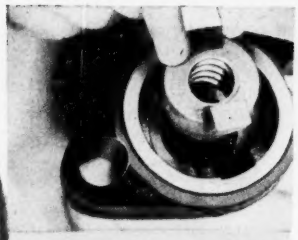
Screwed	Flanged
150 lbs. Steam	125 lbs. Steam
225 lbs. O.W.G.	175 lbs. O.W.G.

Bronze Mounted or All Iron—Sizes ¼" to 3"



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EASY TO CLEAN — You can really get into the bonnet of this valve to clean out the chamber above the operating threads.

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Books

Treatise on Starch and Starch Products Revised and Extended in New Edition

CHEMISTRY AND INDUSTRY OF STARCH, *Second Edition.—Edited by Ralph W. Kerr. Published by Academic Press, Inc., 125 E. 23rd St., New York, N. Y.,* 1950. 719 *pages;* 6¼x9¼ *in.; cloth. Price,* $11.50.

Continuing its initial aim of presenting the accumulated knowledge of starch and the more important starch products, this second edition includes revisions where necessary covering advances made since the appearance of the first edition, six years ago.

Moreover, the treatment on the manufacture of corn starch has been extended and a chapter added on the miscellaneous uses of corn starch. There is also a chapter added on analytical methods that are most commonly used with starch and starch products. These are in addition to methods for inspecting the physical properties of starch, such as the colloidal characteristics of paste, which are repeated in this edition.

As in the earlier edition, it is the aim of the author to provide a survey of the subject for both the carbohydrate chemist and the technologist whose daily task is concerned with more efficient production of starch products and with their efficient utilization. At the same time, there is no pretense that the text is comprehensive. Where a topic has been adequately discussed elsewhere, the reader is referred to such works for further study. This edition also places greater emphasis on the American point of view and on American practices.

Mr. Kerr is a member of the staff of the Corn Products Refining Co., Argo, Ill.

Candy Production

CHOCOLATE AND CONFECTIONERY. *By C. Trevor Williams. Published by Leonard Hill, Ltd., 17 Stratford Place, W, 1, London, Eng.,* 1950. 216 *pages;* 5½x8¾ *in.; cloth. Price,* 25*s.*

Here is a broad survey of the methods and raw materials used in the manufacture of confections in general and chocolate in particular. The author describes the treatise as an up-to-date textbook for technical students and as a reference for personnel engaged in the industry.

From the Briton's point of view at least, the book takes in every step in the manufacture of these products, from the nature and source of the raw materials to a detailed description of all necessary equipment and plant layout.

The book is well worth a careful reading by those engaged in candy production in this country.

Farm Agencies

FEDERAL-STATE-LOCAL RELATIONS IN AGRICULTURE. *By John D. Black. Published by National Planning Assn. 800-21st St., Washington 6, D. C.* 46 *pages;* 5¼x7½ *in.; paper. Price* 50*c.*

This is a summary of a comprehensive report prepared over a year ago by Dr. Black, of Harvard's Graduate School of Business Administration. The report incorporated suggestions and ideas derived from studies at Harvard and other universities and from specialists in agricultural relations, as well as from members of NPA's agricultural committee.

As its title might suggest, this summary examines the complex and not too well integrated administrative mechanisms and relationships that have developed among Federal, state and local agencies dealing with farm operations and farmers.

The pamphlet should help the food processor in developing, and better understanding grower relations.

Agent Listing

DIRECTORY OF MANUFACTURERS' AGENTS SERVING THE CHEMICAL AND FOOD INDUSTRIES. *Published by Chemical Engineering and* FOOD INDUSTRIES, *330 W. 42nd St., New York 18, N. Y.,* 1950. 131 *pages;* 8½x11 *in.; paper. Price* $10.

Compilation of this directory fills a demand frequently voiced by both food and chemical manufacturers. Arranged alphabetically by states, then by cities, and finally by companies within the city, the directory lists the agents, together with the products and manufacturing names handled by them.

ATTRACTIVE PACKAGES! It's easy to produce neat, eye-appealing packages—so important in product merchandising today—when you use Union Special's *Style 60000D* machine to close small paper bags with the exclusive *"Dubl-Tape"* sewed closure.

CAPITALIZE ON THESE FEATURES! Machines are especially designed to help you solve your packaging problems:

- **FAST**—keyed to output of standard filling and weighing equipment.
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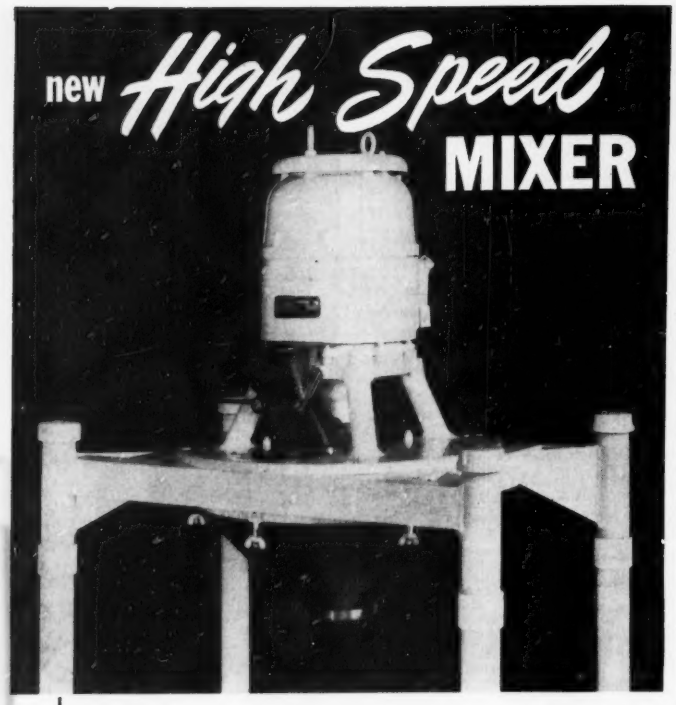

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Research Direction

MANAGEMENT OF INDUSTRIAL RESEARCH. *Published by Arthur D. Little, Inc., Cambridge 42, Mass.* 14 *pages; 8½x11 in.; paper. Free.*

Research is one area of the food industry in which there is ample room for expansion. But while expenditures on food processing research are still lamentably small, they are increasing each year.

So this selected and annotated bibliography should be useful where research departments are getting big enough to develop administrative problems.

Government Publications

HANDLING, STORAGE, TRANSPORTATION, AND UTILIZATION OF POTATOES. *By Dr. D. H. Rose, et all. Bureau of Plant Industry, Soils, & Agricultural Engineering, Bibliographical Bulletin No.* 11. *Price* 35c.

THE CHEMICAL COMPOSITION OF VARIOUS WHEATS AND FACTORS INFLUENCING THEIR COMPOSITION. *By J. H. Shollenberger, et al. U. S. Department of Agriculture, Technical Bulletin No.* 995. *Price* 15c.

LUBRICATION. *Department of the Army, Technical Manual TM* 9-2835. *Price* 45c. Devised for Army technical equipment, but useful in planning food plant lubrication methods and schedules.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.

TESTING BY THE NATIONAL BUREAU OF STANDARDS. *National Bureau of Standards, Circular* 483. *Price* 25c. Describes Bureau policy in conducting tests for other Government agencies, and certification of equipment for the public.

CANE SUGAR REFINING 1946 TO 1948. *Bureau of Labor Statistics, LS50-3597. Mimeographed.* A statistical analysis of productivity in this industry.

FLUID MILK CANS. *National Bureau of Standards, Simplified Practice Recommendation R208-50. Price* 5c. Gives capacities, dimensions, and weights of cans used for shipping and delivery of fluid milk. —End

These Aluminum Containers

HELP ASSURE SANITARY FOOD PRODUCTION

WITH LESS LABOR

WITH SANITATION so important in food plants, these drums are receiving an enthusiastic welcome. They're seamless, have open, easily cleaned beads. Aluminum doesn't affect food flavor, color or taste. Their gleaming finish adds to the clean appearance of your plant. No splinters, paper or dirt will get into foods and ingredients stored or transported.

Newest in the Wear-Ever container line is this two-piece Quick-Lock cover. It forms a tight seal and therefore is especially recommended for liquids.

STRONG & LIGHT

They're made of thick, extra tough alloy. Drums filled with 550 lbs. of wet sand, stacked one on top of another, showed no signs of buckling or sagging, yet aluminum alloy weighs ⅔ *less* than other commonly used metals. Wearing Ring keeps bottoms off rough floors, is attached with a sanitary, continuous weld.

A SIZE and TYPE FOR EVERY NEED

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30 GALLON
18" dia. x 27½" deep

50 GALLON
22¾" dia. x 28½" deep

COVERS

QUICK-LOCK

SLIP-OVER TYPE

HINGE TYPE
with lock-on bolt and cover rest

DOLLY

Use drum with dolly as a removable bin for interplant transportation.

Easy to move around — especially when a Wear-Ever dolly that fits these drums is used.

WEAR-EVER Aluminum

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Catalogs, Bulletins

Food Plant Equipment

Process Pumps A

Designed for handling all types of liquids, CP process pumps are described in 4-page Bulletin 1125. Capacities range from 15 to 600 gpm., for heads from 15 to 240 ft.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Steam, Air, Gas Meters B

Cross-sections and specifications for line of steam, air and gas meters are outlined in 16-page Bulletin 400-FI. Capacity tables for saturated steam, air and gas for Shuntflo and by-pass meters are given.—*Builders-Providence, Inc., Providence 1, R. I.*

Automatic Heating Units C

Successful applications of automatic heating units for bottling plants are cited in 8-page booklet.—*G. C. Evans Sales Co., Little Rock, Ark.*

Sampling Valves D

Cross-section drawings and dimensions of sampling valves for 150- and 300-lb. service are contained in 4-page Bulletin 4.—*Alloy Steel Products Co., Linden, N. J.*

Feeders E

Covering a feeding range of 1 to 5,000 lb. per hr., three sizes of Universal feeders are fully delineated in 12-page Bulletin 20-G14. Information on typical applications is included.—*Omega Machine Co., Providence, 1, R. I.*

Solenoid Valves F

For open or closed service stainless-steel or disk seats, solenoid valves are described in 8-page Bulletin V. Sizes are from ¼ to 3 in., for pressures up to 150 lb.—*The Johnson Corp., Three Rivers, Mich.*

High-Pressure Atomizing Oil Burner G

Offering three flame types, cylindrical, conical and flat, Venturi high pressure steam or air atomizing oil burners are particularized in 8-page Catalog 456.—*Hauck Mfg. Co., 124 10 St., Brooklyn 15.*

Positive Pressure Pumps H

Diagrams and engineering suggestions on positive pressure vane and gear pumps are featured in 12-page Catalog 200. Pumps are close-coupled and will move non-lubricating liquids at high pressures.—*Eastern Industries, Inc., New Haven, Conn.*

Polyphase Horizontal Motors I

One to 75 hp. horizontal motors are illustrated in cross section views in 12-page Bulletin EM4-812. Construction details are cited.—*A. O. Smith Corp., Motor Div., Los Angeles 22.*

Ammonia Valves for Refrigeration J

Complete line of ammonia valves for refrigeration plants is shown in 10-page Catalog 1950. Included are shut-off and line valves, gage sets, relief valves and accessories.—*Cyrus Shank Co., 625 W. Jackson Blvd., Chicago 6.*

Electric Heating Elements K

Voltages, wattages, temperature ranges, dimensions, shipping weights and prices on lines of immersion, urn-type, finrod, and rod-type electric heating units are given in 16-page catalog—*Tuttle & Kift, Inc., 1827 N. Monitor Ave., Chicago 39.*

Steel Unions and Valves L

Specifications, sizes and prices on complete line of hot forged steel unions and valves are shown in 20-page Catalog 11. There are standard and extra heavy unions, as well as orifice, male and female, lug nut, and full stainless steel and full alloy unions.—*Catawissa Valve & Fittings Co., Catawissa, Pa.*

Rotary Pumps M

Sliding and swinging vane type rotary pumps are outlined in 6-page Bulletin 307. Capacities are from 5 to 1,500 gpm.—*Blackmer Pump Co., Grand Rapids, Mich.*

Sweetwater Circulating Tank N

Bulletin 600 describes new line of sweetwater circulating wall storage tanks. Sizes range from 600 to 6,000 gal., with irregular shapes for plants where space is limited.—*Chicago Stainless Equipment Corp., 5001 Elston Ave., Chicago 30.*

Sludge Contact Reactors O

Principles, applications and descriptions of rectangular and round sludge contact reactors are completely covered in 16-page Publication 5001, profusely illustrated with diagrams and sketches.—*Cochrane Corp., 17 St. below Alleghany Ave., Philadelphia 32.*

Water Conditioner P

Presented in 12-page Bulletin 2144 is line of water conditioning equipment. Described are 3-stage precipitator, de-alkalizer, Neutralite filter, and the activated carbon purifier.—*The Permutit Co., 330 W. 42 St., New York 18.*

Internal Tube Cooler Q

An easy-to-clean, compact stainless steel internal tube cooler for liquid food products is outlined in 4-page Bulletin 224. Specifications and dimensions are listed.—*Mojonnier Bros. Co., 4601 W. Ohio St., Chicago 44.*

Ovens and Incubators R

Performance data and improved features of redesigned line of Thelco ovens and incubators are contained in 8-page Bulletin 376. A new model vacuum oven is also shown.—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.*

D. C. Motors S

Bulletin C-2001, 12 pages, features design, construction, selection tables, and frame dimensions for heavy duty, constant and adjustable speed d. c. motors. Capacities range from

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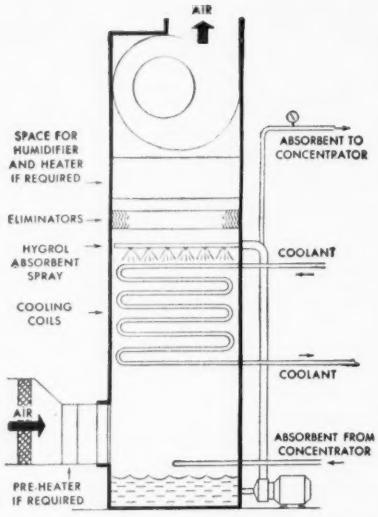
New Method Gives Precise Control in Air Conditioning

Niagara "Controlled Humidity Method" Uses Hygrol, Hygienic Liquid Absorbent

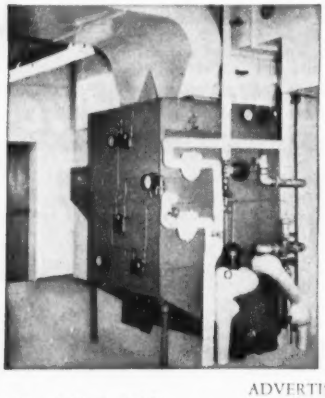


NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

● The Niagara "Controlled Humidity Method" is a new system of air conditioning giving complete control of temperature and relative humidity, holding constant conditions or varying them at the will of the user. Especially, it provides dry air at normal atmospheric temperatures with little or no refrigeration required. A condition of 15 grains of moisture per pound of air at 85 deg. F. dry bulb temperature has been produced without refrigeration.

The apparatus is enclosed in a casing thru which the air is drawn by fans. The air is filtered and then enters a chamber where it is dehumidified in passing thru a spray of "Hygrol" Liquid (a hygienic hygroscopic chemical that absorbs the air-borne moisture and contains no salts or solids to precipitate) In the same chamber are located cooling coils which remove the latent heat of evaporation and also sensible heat as required.

The absorbent liquid spray falls into a tank at the base, where it is piped to a concentrator, removing moisture taken from the air. The re-concentrated liquid returns to the system. This process is continuous, and the apparatus operates at full capacity at all times.



The same equipment may be used to provide winter air conditioning when required, by installing a tempering coil at the outdoor intake, an humidifier, and a reheat coil above the eliminators.

This equipment is manufactured in a range of sizes providing from 1000 to 20,000 CFM of conditioned air from a single unit, and mutiple unit installations are practical. It is expected that, by reducing the need for refrigeration, the cost of air conditioning will be reduced by this method. Applications generally are in a temperature range from 35 deg. F. upward. Below the freezing temperature of water, the Niagara "No-Frost" method is applicable.

The equipment is protected by U. S. and foreign patents. Installations have been made in food and chemical process industries, in packaging hygroscopic products, for preventing condensation of moisture on metals and other products in storage, in air conditioning for laboratory control and for human comfort.

For further information, write Niagara Blower Company, Dept. **FI,** 405 Lexington Ave., New York 17, N. Y.

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¾ to 1,000 hp.—*Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10.*

Proportioning Oil Burner A

Dimensions, capacity tables, shutter and support data on proportioning oil burners are given in 8-page Bulletin 501. Of sturdy construction, unit offers lever control and positive oil atomization.—*The Anthony Co., 47-33 Fifth St., Long Island City, N. Y.*

Centrifugal Process Pumps B

Vertically split, single-stage, volute centrifugal process pump is pictured in 4-page Bulletin W-341-B14. For pressures up to 450 psi. and temperatures to 500 deg. F., it will handle both corrosive and non-corrosive liquids. —*Worthington Pump & Machinery Corp., Harrison, N. J.*

Hot Water Heaters C

Four-page Bulletin WH-12 points out features of compact instantaneous steam injection heaters, and gives sizes and specs.—*Pick Mfg Co., Heater Div., West Bend, Wis.*

Materials Handling

Four-Way Pallets D

Block leg, notched stringer and expendable types of 4-way pallets are pictured in 4-page folder.—*Pallet Licensing Co., 795 Boyleston St., Boston 16.*

Trolley Cable Conveyor Units E

Specifications of standard stock units of Universal trolley cable conveyor are given in Bulletin 41. These units allow field erection of an overhead trolley conveyor without welding.—*The E. W. Buschman Co., Cincinnati 32.*

Fork Trucks F

House organ *Material Handling News* contains 16-page picture spread on unusual applications of the fork lift truck.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Automatic Bagging Scale G

Data sheet 4916 shows new model portable automatic bagging scale for mash feed, pellets, and similar materials. Capacity ranges from 1 to 4 cu. ft., rate of discharge 10 to 15 a min.—*Richardson Scale Co., Clifton, N. J.*

Pneumatic Conveying Systems H

Utilizing pressures from 1 to 10 psi, pneumatic conveying systems are sketched in over 15 different plant applications. Each installation depicts an advantage of the system.—*Convair Corp., Pittsburgh.*

Ordering Belt Conveyors I

How To Order Belt Conveyors is title of 6-page brochure which contains information on specifying distances, lifts, models, and other pertinent data.—*Speedways Conveyors, Inc., 1271 Niagara St., Buffalo, N. Y.*

Control Equipment

Light-Scattering Microphotometer J

Bulletin 2182 presents details on a new light-scattering microphotometer which measures 20 micromicrolumens of scattered light. Unusual sensitivity is reported.—*American Instrument Co., Silver Spring, Md.*

Colorimeter K

A high-grade filter-colorimeter, called Nepho-Colorimeter, is presented in 4-page Bulletin

B-215. Instead of utilizing a monochromator and associated wavelength scale, spectral isolation is obtained through use of optical filters.—*Wilkens-Anderson Co., 4525 W. Division St., Chicago 51.*

Water Engineering Services A

Case histories of how some very ticklish water engineering problems were solved are given in 4-page booklet. Procurement, treatment, usage and disposal are covered.—*Hall Laboratories, Inc., Hagan Bldg., Pittsburgh 30.*

Temperature Regulators B

Two-page Bulletin 50-1000 illustrates principles and specifications of the recently re-introduced Stacon unit, a self-operated, hermetically-sealed temperature regulator.—*Farris Stacon Corp., Palisades Park, N. J.*

Liquid Measuring Gage C

A hydrostatic instrument that directly shows weight, volume and depth of liquids in storage and in process, King-Gage, is announced in a 12-page bulletin. Illustration and details cover operation, calibration and accuracy.—*King Engineering Corp., Box 300, Ann Arbor, Mich.*

Plant Supplies

Cap and Set Screws D

Specifications and prices of recently announced small wire-size multiple-spline socket cap screws and set screws are given in 6-page Bulletin 881. Sizes runs as small as No. 2 wire.—*The Bristol Co., Waterbury 20, Conn.*

Gas Torch E

Highlights of a new portable liquid petroleum gas torch are given in 2-page leaflet. Designed for instant lighting, it is reported usable in both cold or warm temperatures.—*Otto Bernz Co., Inc., 280 Lyell Avenue, Rochester 6, N. Y.*

Pressed Steel Products F

Four-page folder lists sizes of deep drawn pressed steel tanks, shells, bowls, ladles and pots.—*American Car & Foundry Co., 30 Church St., New York 8.*

Label and Box Paper Stock G

Seven sample colors of a new lamination of transparent plastic film to paper stock, tradenamed Doplex, are contained in 4-page brochure. The stock is reported tough and durable, soilproof, and resistant to moisture, grit, dust and grease.—*The Dobeckmun Co., Cleveland 1.*

Hose Couplings and Fittings H

General and maximum pressure recommendations, specifications, and description of threads on over 20 types of hose couplings and fittings are presented in 12-page Catalog Section 3100.—*B. F. Goodrich Co., Akron, Ohio.*

Iron, Malleable and Bronze Fittings I

Complete line of cast iron, malleable and bronze fittings, including recent additions, is set forth in Bulletin 104.—*The Kennedy Valve Mfg. Co., Elmira, N. Y.*

Flexible Rotary Pressure Joints J

Eight-page booklet illustrates line of flexible rotary pressure joints. Described as packless and leakproof, they have all-metal seatings.—*Phillips Rotary Joint & Valve Co., Inc., 730 Grand St., Hoboken, N. J.*

General Plant Supplies K

An unusually comprehensive general-supply publication, Catalog 50 contains 780 pages of tool and material listings, commodity listings,

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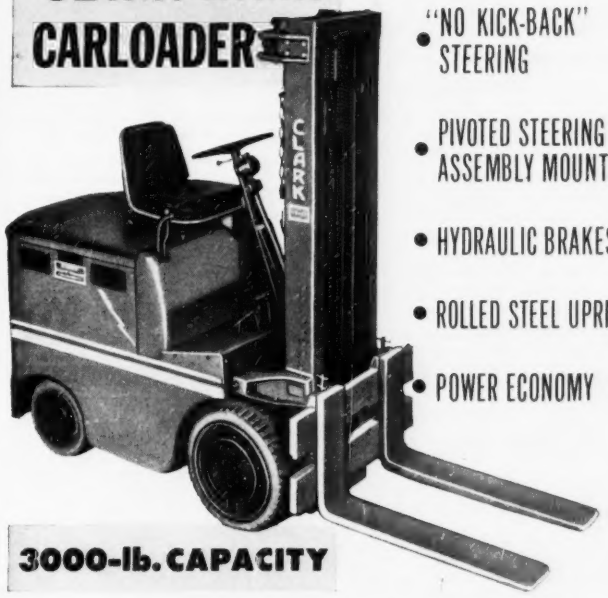

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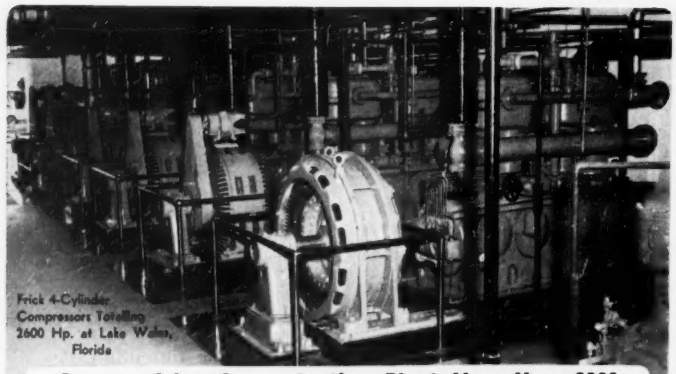

Frick 4-Cylinder Compressors Totalling 2600 Hp. at Lake Wales, Florida

Orange Juice Concentrating Plant Now Uses 3180 Horsepower of Frick Refrigeration

The Florida Citrus Canners Cooperative at Lake Wales, largest of its kind in the world, depends on this battery of six Frick refrigerating machines for heavy-duty heat-pump service.

Hot gas, discharged from the compressors, heats the orange juice, driving off excess moisture as low-pressure steam. This is condensed by the "cold" side of the refrigerating system, and the heat is efficiently recovered.

Nine other Frick compressors chill, quick-freeze, and store the concentrated juices.

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and useful engineering data.—*The Republic Supply Co. of Calif., 2600 S. Eastland Ave., Los Angeles.*

Corrosion Resisting Cements **A**

Use of corrosion resisting cements to repair cracked, corroded and broken pipe, valves, and other mechanical equipment in corrosive service, is described in 2-page Bulletin C-8. Cements are suitable for repair of equipment made of steel, iron, hard rubber, glass, porcelain, carbon, stoneware, wood or plastic.—*Carboline Co., 7603 Forsyth Blvd., St. Louis 5.*

Miscellaneous

Packing and Sealing Machines **B**

Advantages, applications, properties and sealing technics for corrugated and solid-fiber shipping cases are illustrated in 8-page Bulletin 22. Case sealing machine operation is shown.—*Paisley Products, Inc., 1770 Canalport Ave., Chicago 16.*

Reconditioning Steel Drums **C**

How Wheelabrator Blast Cleaning Simplifies the Reconditioning of Steel Drums, 4 pages, tells just that. Heart of process is a rapidly rotating bladed wheel that hurls abrasives by controlled centrifugal force.—*American Wheelabrator & Equipment Corp., 800 S. Byrkit St., Mishawaka, Ind.*

Cellophane History **D**

The Story of Cellophane, 24 pages, presents a detailed history of the development of cellophane, including a section on food packaging.—*E. I. du Pont de Nemours & Co., Wilmington 98, Del.*

New Printing Method **E**

Directories, catalogs, price and parts lists can be prepared in office using "Flexoprint" method. No metal type is used. System is outlined in 24-page booklet.—*Remington Rand, 315 4th Ave., New York 10.*

Single Bed Deionization **F**

History, behavior, present performance, and potential uses of "Amberlite Monobed Deionization", a single bed water conditioning and chemical processing system, are treated in 12-page booklet.—*Rohm & Haas Co., Washington Square, Philadelphia 5.*

Bent Tubing **G**

Line of equipment for all sorts of tube bending is pictured in 60-page booklet. Information on how to bend is also given.—*Wallace Supplies Mfg. Co., 1300 Diversey Pkwy., Chicago 14.*

Steam Circulation System **H**

Stated to improve efficiency of tubular heaters in stills and evaporators, new steam circulation system is described in 8-page Bulletin 4. It creates a turbulent—rather than sluggish—flow of steam and condensate.—*Sarco Co., Inc., Empire State Bldg., New York 1.*

Meat Packing Maintenance **I**

Typical examples of how stainless steel installations can cut maintenance costs are illustrated in 6-page folder.—*Armco Steel Corp., 2350 Curtis St., Middletown, Ohio.*

Glass-Beaded Paper **J**

Three-page laboratory report reveals how "Spherekote," a glass-beaded paper, may be used as an inner lining in fiberboard containers and as a wrapping material for special packaging work.—*Minnesota Mining & Mfg. Co., St. Paul, Minn.* —*End*

"HOTTER, SOONER" Saves YOU MONEY

Yarway Impulse Steam Trap with new stainless steel body.

Yarway Impulse Steam Traps get equipment hot and into production *faster.* Extra profits!

Then they keep it *continuously* at peak operating temperatures for maximum production. More extra profits!

What's the reason for *hotter, sooner?* Just this. When steam is turned on, Yarways open wide, discharging the air and condensate *in a hurry* —closing only when steam arrives. Then, when operating temperature has been quickly reached, the little valve (only moving part) literally *floats on the load* . . . discharging heat-retarding condensate as soon as it forms instead of waiting for quantities to accumulate. Thus equipment is held at peak operating efficiency.

Other economical features of Yarway traps—minimum maintenance, easy installation, low initial cost.

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Try a Yarway today . . . standardize on Yarways tomorrow.

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Nest of Yarway traps installed with Yarway Strainers on cloth dryer. Note small space required.

Stainless Steel Body

YARWAY IMPULSE STEAM TRAP

Serving Industry... which Serves Mankind

NEW LABORATORY SERVICE FOR FOOD INDUSTRY

A food technology laboratory recently was established at Anniston, Ala., by Monsanto Chemical Company. This laboratory, staffed by capable technologists, is conducting continuous research into the growing application of chemistry to foods. Perhaps this laboratory can help you with some of your problems.

GROWING IMPORTANCE OF CHEMISTRY IN FOODS

Chemistry is gaining in importance to the food industry, contributing to virtually every improvement in leavening, food fortification and food preservation. Monsanto, which serves the food industry with nearly half a hundred chemicals, already has made many advancements in the applications of chemicals to foods. The new laboratory was established by Monsanto primarily to determine where chemicals can *improve the quality* and nutritive value of foods. A few of the many operations in the Monsanto laboratory are illustrated here.

STUDYING RANCIDITY IN CEREAL PRODUCTS

T. W. Schilb, who has charge of Monsanto's food technology laboratory, is shown using the "Rancimeter" to evaluate rancidity development in cereal products.

LEADER IN LEAVENING FOR MANY YEARS

For many years, Monsanto has been a leader both in research and in manufacturing of phosphates for leavening. Among Monsanto products that are widely used as leavening agents for baked goods are: Sodium acid pyrophosphate and mono calcium phosphate. Recently, Monsanto has developed sodium acid pyrophosphate, MD grade, designed especially for machine-made cake doughnuts. The above photo shows Baking Chemist Elizabeth McKim and Mr. Schilb scoring chemically leavened baked products.

TAKING THE FOAM FROM FERMENTATION

Where fermentation foam is a problem, Monsanto's foam inhibitor, AE-1, can be a chemical servant of the food industry. In the illustration at the left, Dr. Roy E. Morse, of Monsanto's food technology laboratory, measures the foam of aerated fermentation that contains no inhibitor. At the right, you see how foam vanishes before Monsanto's AE-1.

LITERATURE FREE UPON REQUEST

Monsanto literature, describing chemicals for the food industry, is worth-while reading if you are interested in the production of quality products. These pieces contain technical data of value to the food industry. Any or all of them will be sent free upon request. The coupon below is for your convenience.

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If you have a problem in food technology, you are invited to bring it to Monsanto. Our food technologists may have a solution for you. For details, mail the coupon or contact the nearest Monsanto Sales Office. MONSANTO CHEMICAL COMPANY, Phosphate Division, 1737-J South Second Street, St. Louis 4, Missouri.

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Patents

Dry Soluble Coffee Prepared From Liquid Coffee Extract Containing From 30 to 60 Percent Soluble Coffee Solids by Weight by Means of Evacuated Chamber Maintained at Total Pressure of Not Greater Than 4 mm. Mercury by Means of Water Vapor Pumping System—*H. W. Schwarz, Natick, E. G. Hellier, Medfield, and A. L. Schroeder, Brookline, Mass., to National Research Corp., Cambridge, Mass. No. 2,504,735. Apr. 18, 1950.*

Cooked Frozen Product Made From Several Constituents by Cooking and Freezing Separately the Constituents and Protecting Inherent Flavors and Tastes by Coating Each Frozen Constituent With Layer of Ice—*H. A. Noyes, Watertown, Mass. No. 2,504,869. Apr. 18, 1950.*

Starch Separated From Wheat Flour by Making Into Batter to Hydrate Gluten Preliminary to Washing Out Starch With Water, Aerating Gluten and Separating Gluten From Remaining Components by Flotation—*E. M. Burdick, Peoria, Ill., to United States of America. No. 2,504,962. Apr. 25, 1950.*

Mixture of Higher Fatty Acid Separated Into Fractions Having Different Melting Points—*H. T. Spannuth, Chicago, to Wilson & Co., Inc. No. 2,505,012. Apr. 25, 1950.*

Proteinaceous Mixture Consisting of About 80 Percent by Weight of Wheat Gluten and About 20 Percent by Weight of Corn Gluten Hydrolyzed With Mineral Acid for Formation of Glutamic Acid—*P. D. V. Manning, Glencoe, Ill., to International Minerals & Chemical Corp. No. 2,505,129. Apr. 25, 1950.*

Apples Cut in Half Through Core to Permit Inspection for Infestation During Passage Along Conveyor Belt—*F. Derbenwick, Oakland, J. F. Ryan, Jr., San Leandro, and N. C. Calhoun, Oakland, Calif., to Gerber Products Co., Freemont, Mich. No. 2,505,235. Apr. 25, 1950.*

Doughnuts Formed From Viscous, Compact Dough During Passage Downward Through Cylinder Fitted With Screw Feed and Reciprocating Action Wire Cutter—*H. C. Hewitt, Detroit, and F. H. Morgan, Grosse Pointe Woods, Mich., to W. Stern, Detroit, Mich. No. 2,505,243. Apr. 25, 1950.*

Rice and Similar Raw Cereals Subjected to Continuous Countercurrent Flow of Dry Air at About 650 to 1200 Deg. F. Sufficiently Long to Cook Cereal and Convert Into Exploded State—*J. W. Hubbard, New York City, to Alaska Pacific Salmon Co., Seattle, Wash. No. 2,505,325. Apr. 25, 1950.*

Fatty Oils Refined by Solvent Extraction—*G. H. Palmer, Fanwood, N. J., to M. W. Kellogg Co., Jersey City, N. J. No. 2,505,338. Apr. 25, 1950.*

Fungus Enzymes Produced by Growing Mold on Coarse Particles of Cereal Grain Including Bran Mixed With From 25 to 50 Per cent By Weight of Relatively Light and Porous Cereal Particles—*G. A. Jeffreys, Salem, Va., one half to I. H. Jeffreys. No. 2,505,360. Apr. 25, 1950.*

Confections Packaged by Covering with Edible Coating, Positioned on Flexible Sheet in Spaced Rows While Coating is Still Moist, Cooling to Non-Sticky State, Folding Opposite Sides of Flexible Sheet Over Confections and Rolling to Form Complete Package—*J. Burstiner, New York City. No. 2,505,384. Apr. 25, 1950.*

Rye Products Made by Extruding Light Batter Into Predetermined Forms on Supporting Surfaces, Baking, and Dehydrating to Desired Degree of Crispness—*A. T. Johnson, Hutchinson, Kans. No. 2,505,407. Apr. 25, 1950.*

Cream Mechanically Whipped Under Controlled Gas Pressure While Contained in Small Valved Dispenser—*F. F. Suellentrop to Lemay Machine Co., Lemay, Mo. No. 2,505,439. Apr. 25, 1950.*

Cream and Like Frozen to Remove Water and Concentrate Oil Content, Thawed, and Churned to Coalesce Oil Into Butter—*H. A. Toulmin, Jr., to The Commonwealth Engineering Co. of Ohio, Dayton. No. 2,505,654. Apr. 25, 1950.*

Crude Glycerine Containing At Least 75 Percent Glycerol Purified by Interaction With Zinc and Iron for Formation of Hydrogen and Sulphates, Neutralized to pH of 7.5 to 10.0, Filtered, and Distilled—*H. S. Halbedel, Euclid, O., to Harshaw Chemical Co., Cleveland, O. No. 2,505,735. Apr. 25, 1950.*

Liquid Honey Used as Hygroscopic Agent for Making Sweetened Moist Coconut—*W. F. Straub, to W. F. Straub & Co., Chicago. No. 2,505,746. Apr. 25, 1950.*

Vegetable Seeds and Nutmeats Extracted With

STAINLESS STEEL **THOMSEN** NICKEL ALLOY

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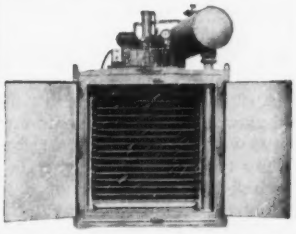

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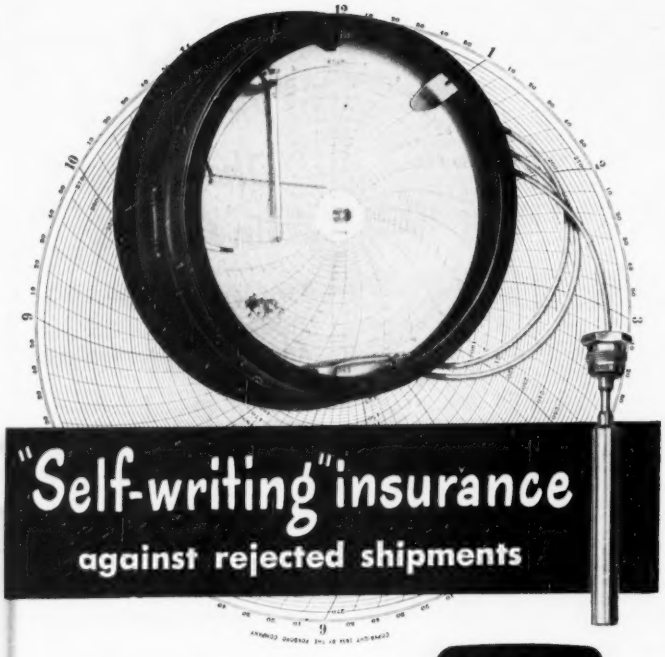

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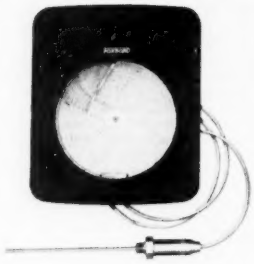

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Hot Ethyl Alcohol For Recovery of Alcohol-Soluble Oil—*A. C. Beckel, Peoria, P. A. Belter, Pekin, and H. J. Deobald, Peoria, Ill., to the United States of America. No. 2,505,749. May 2, 1950.*

Mushroom Mycelium Distilled to Obtain Essence With Characteristic Taste and Flavor of Mushrooms—*J. Szuecs, Yonkers, N. Y., one-tenth to G. M. Wiles, Roslyn, N. Y. No. 2,505,811. May 2, 1950.*

Meat Smoked Under Conditions Which Control Direction of Flow of Heated Fluid By Devices For Alternately Increasing and Decreasing Rate of Flow Through One Section While Simultaneously Alternately Decreasing and Increasing Rate of Flow Through Other Section of Smokehouse—*J. A. Julian to Oscar Mayer & Co., Inc., Chicago. No. 2,505,973. May 2, 1950.*

Cheese Made By Method Using Two Whey-Draining Vats and One Matting Vat.—*R. Miollis, Maywood, Ill. No. 2,505,984. May 2, 1950.*

Foodstuffs Shaped Into Predetermined Form and Unit Size During Air-Blast Quick-Freezing By Means of Removable Container Used As Mold—*H. A. Noyes, Watertown, Mass. No. 2,506,099. May 2, 1950.*

Piecrust Mix Made to Consist of Flour, Shortening, and Small Quantity of Casein, Not Constituent of Milk—*C. G. Harrel, R. O. Brown, and M. H. Kimball to Pillsbury Mills, Inc., Minneapolis. No. 2,506,358. May 2, 1950.*

Vanillin in High Yield and Purity Recovered From Crude Concentrate By Distillation—*C. C. Bryan, Seattle, to Monsanto Chemical Co., St. Louis. No. 2,506,540. May 2, 1950.*

Skin of Whole Citrus Fruit Scraped or Cut to Release Essential Oils Into Gas Stream For Recovery—*M. C. Carnarius, Jr., Miami Beach, Fla. No. 2,506,776. May 9, 1950.*

Loose Fruit Conveyed From Delivery Belt to Lower Level By Buckets Attached to Endless Chain Driven By Sprocket—*G. M. Criger, Riverside, Calif., to Food Machinery & Chemical Corp. No. 2,506,779. May 9, 1950.*

Raw Whole Peeled Potatoes Made Resistant to Decay and Enzymic Oxidation by Heat-Treating to External Depth of 1/16-4 in. and Applying Enzymic Oxidation Inhibitor Containing About 1 Percent Available SO_2.—*A. F. Kalmar, Riverside, and R. W. Kilburn and H. M. Pancoast, Jr., San Jose, Calif., to Food Machinery and Chemical Corp. No. 2,506,793. May 9, 1950.*

Stems Removed From Fruit During Oscillatory Movement of Mechanical Unit Constructed to Engage Stem Protruding Through Slot of Frame Supporting Fruit—*V. E. Pinard, San Jose, Calif., to Richmond-Chase Co., No. 2,506,889. May 9, 1950.*

Meat, Fish, and Poultry Smoked Without Substantial Drying At About Atmospheric Temperature For 12 to 24 Hr., Wrapped At End of Smoking, and Immediately Frozen—*L. S. Thompson, Red Bank, N. J. No. 2,506,908. May 9, 1950.*

Piecrusts Mechanically Shaped By Aid of Wire Screen Element—*A. A. Klingbiel, Los Angeles. No. 2,506,928. May 9, 1950.*

Containers of Solid, Frozen Sweet Cream Fats Mechanically Slit and Moved Along Supporting Frame to Be Emptied—*J. B. Orrell to Abbotts Dairies, Inc., Philadelphia. No. 2,506,969. May 9, 1950.*

Natural Spice Fiber Particles Substantially Low in Oleoresin Content Externally Coated With Oleoresin Identical in Kind to Bring Total Content to Desired and Natural Level—*H. R. Ansel, Oak Park, Ill., to Wm. J. Stange Co., Chicago. No. 2,507,084. May 9, 1950.*

Fatty Glycerides Subjected to Alkali Refinement in Presence of Inorganic Phosphate—*S. J. Rini, Winchester, Mass., to Lever Bros. Co., Cambridge. No. 2,507,184. May 9, 1950.*

Fresh Whole Citrus Fruit Intensified in Color By Spraying With Aqueous Emulsion of Edible Dye While Being Conveyed in Layer Along Substantially Horizontal Path—*R. D. Gerwe, Clearwater, and J. M. Fiske, Lakeland, Fla., to Food Machinery and Chemical Corp., San Jose, Calif. No. 2,507,438. May 9, 1950.*

Confectionery Cream or Fondant Made in Continuous Manner Under Controlled Conditions—*S. P. MacDonald, Arlington, Mass., and J. I. Thompson, Washington, D. C., to New England Confectionery Co., Cambridge, Mass. No. 2,507,477. May 9, 1950.*

Lactalbumin Coagulated and Separated From Whey and Subsequently Treated For Uniform Dispersion Throughout Curd in Cheesemaking—*G. W. McDonald and E. C. Scott, Ashton, Ill., to Swift & Co., No. 2,507,480. May 9, 1950.*

Milk Shakes Prepared From Dried Powdered Ice Cream Mix Constituents and Dried Milk—*E. C. Scott, Ashton, Ill., to Swift & Co. No. 2,507,482. May 9, 1950.*

Meat Ground, Made Into Patty, and Smoked to Form Coherent Mass With Porous Surface—*A. Weissenbach, New York City. No. 2,507,486. May 9, 1950.*

Shell Eggs Mechanically Filled Into Cartons—*K. T. Buttery and E. Hubbard to Sutherland Paper Co., Kalamazoo, Mich. No. 2,507,498. May 16, 1950.*

Grain Scoured and Cleaned By Action of Abrasive Rotor Mounted on Vertical Axis and Operating in Zone of Air Currents—*L. E. Egedal, Milwaukee. No. 2,507,507. May 16, 1950.*

Dehydrated Vegetables Heated and Compressed Into Blocks By Pressure From Two Opposite Faces and Permitted to Cool With Gradual Release of Pressure—*G. S. Smith, Berkeley, Calif., to United States of America. No. 2,507,550. May 16, 1950.*

Pureed Mixture of Fully Ripened, Partially Ripened, and Green Bananas Heated to Boiling, Packed in Hermetically Sealed Container, and Heat-Treated at 190 Deg. F. for about 30 Min.—*P. R. Foote, Cincinnati, O. No. 2,507,564. May 16, 1950.*

Frozen Material Dehydrated While Under Pressure of Less Than 3 mm. of Mercury—*K. C. D. Hickman to Eastman Kodak Co., Rochester, N. Y. No. 2,507,632. May 16, 1950.*

Fish Positively Positioned By Mechanical Means on Feeder Table for Dressing Machines—*N. L. Oates to Smith Cannery Machine Co., Seattle. Nos. 2,507,808, 2,507,809; and 2,507,810. May 16, 1950.*

Food Masses Impaled on Plurality of Projected Spurs or Teeth Between Two Metallic Plates to Aid in Quick Freezing or Quick Thawing—*W. J. Mead, Belmont, Mass., to Reynolds Metals Co., Richmond, Va. No. 2,507,862. May 16, 1950.* —End

Increase consumer demand . . .
Raise flavor levels . . . with

Huron **MSG**
MONOSODIUM GLUTAMATE 99+%
and
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HYDROLYZED VEGETABLE PROTEINS

For that perfection in food flavor which assures enthusiastic consumer acceptance and continuing demand . . . many food processors have already found Huron MSG and Huron HVP valuable aids in raising flavor levels.

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SOUPS:

In chicken soups add MSG at 0.2% on a ready-to-serve basis. For vegetable soups and chowders, use MSG at 0.15%, while for mushroom and creamed vegetable soups use MSG at 0.2%. Soups with strong beef stock taste are more effectively improved with Huron HVP, prepared in liquid, paste and powder form for convenient application. In canned soups of this type the HVP liquid should be added at 1.0% up to 2.0%. Soups of less pronounced meat stock flavor should contain 0.5% to 1.0% HVP alone, or in combination with the amounts of MSG recommended above. For dry soups the HVP powders are used, at corresponding levels, adjusted for flavor solids content.

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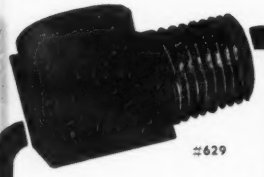

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Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
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Troops Need Cereal

—Continued from page 57

operative research among interested members of the industry will be required to iron out remaining difficulties in processing this type of product. The type of food unit desired is a nut- or fruit-flavored cookie of high stability. The ratio of carbohydrate, fat, and protein should approximate 2:3:14.

"A" and "B" Ration Items

Among the cereal and baked product items to be included in the "A" and "B" ration components are foil-wrapped breads, prepared bakery mixes, and a wheat concentrate.

Foil-Wrapped Bread

Work conducted at the Quartermaster Food & Container Institute has resulted in the development of foil-wrapped bread that will remain acceptable and palatable for a period up to 90 days. The loaf (1 lb. pullman type) is now wrapped in metal foil, then overwrapped with cellophane. The bread can be made behind the lines where baking facilities are available and then transported into the advanced areas.

It remains to be determined whether the present method—wrapping in foil, pasteurizing by heat, and overwrapping and sealing with cellophane—is the one most suitable to use with this product or if a better one can be found.

Of equal interest are the wrapping materials themselves. Availability of these materials is an important consideration here, since production in considerable volume would be entailed.

Prepared Mixes

Well-adapted to the needs of the armed forces in areas where facilities are limited and where trained bakery personnel are scarce are the prepared bakery mixes. These simplify both supply and preparation procedures, inasmuch as a prepared mix has all of the essential ingredients—with the exception of the required water—in a single container. Moreover, such mixes are already weighed and blended, hence the possibility of errors in scaling is virtually eliminated. In short, through the use of these mixes, little skill in the preparation of an acceptable baked product is required, and the need for expert personnel is reduced to a minimum. White and spice cake mixes are examples of the items desired.

Yellow and chocolate mixes of greater shelf life are also desired. Here, the presently available mixes with desired properties approach, but do not quite meet the stability requirements established. The stability of such mixes for armed forces use must be considerably greater than that of commercially manufactured and utilized prepared mixes.

The process of deterioration in prepared mixes is complex, however, and steps toward understanding it have been limited. It has been shown that a granular type of shortening (hydrogenated shortening, spray-dried in combination with egg and dried milk solids) is more stable than a plastic shortening in prepared mixes. But there is required an even more stable shortening product for inclusion in prepared mixes.

Research has revealed that reduced moisture content in the prepared mix increases its stability. Since flour is the principal moisture-bearing ingredient, dehydration of the flour appears to be the most feasible method of reducing moisture contents in prepared mixes. The development of commercial methods for dehydrating flour without causing damage to its baking property is needed.

Sought, too, is a full-flavored non-hygroscopic dehydrated molasses product that can be incorporated in a ginger-bread cake mix. Commercially available molasses powders are exceedingly hygroscopic and cause production difficulties. The hygroscopicity of the molasses powder also impairs the stability of the resulting prepared mix. Processes have been developed whereby the molasses ingredient has been successfully dehydrated in conjunction with the other ingredients, but in the event of mass procurement, a dehydrated molasses product, non-hygroscopic in nature, would likely be needed by suppliers generally.

Whole Wheat Concentrate

In overseas areas, whole wheat flour cannot be used for bread-baking purposes because of its extremely short storage life. Rancidity and loss of baking qualities quickly develop in this flour, and it is also highly susceptible to insect infestation.

Accordingly, it is highly desirable that there be developed a wheat concentrate that can be added to army issue wheat flour for use in overseas areas to alleviate the monotony of white bread.

Since the keeping qualities of whole wheat flour are difficult to improve, the development of such a concentrate containing the wheat bran, shorts, and germ portion of the wheat berry is needed. Experiments conducted at the Quartermaster Food & Container Institute have indicated that a concentrate can be produced that will possess the desired stability. It can also be rendered free of all forms of viable

insect infestation. Commercial methods for producing such a wheat concentrate are required, however, and the industry can be of great help in meeting this need.

The foregoing statement of representative problems will, it is hoped, inspire suggestions from the industry. The Institute through the years has already received much aid from this source. Although in certain projects, such as those devoted to canned baked products, our developmental work has been of reciprocal benefit to the industry, the rewards for such aid must always be, in the main, the satisfaction obtained from contributing to national preparedness.

—*End*—

Swift Builds Its Men

—*Continued from page 43*

have the opportunity for increased earnings for extra effort in production; (3) a Suggestion Plan with financial rewards for ideas; (4) Group Life Insurance on a yearly contract basis, available to members of the Employees Benefit Association; and (5) cooperation with employees in the establishment of credit unions.

Group surgical and hospitalization plans, wherever available, are brought to the attention of workers, and many have taken advantage of this reasonable-cost health insurance.

Still other policies in effect are designed as relief to employees suffering loss of income while serving as jurors or witnesses in court cases; to make loans (repayable by payroll deduction) to meet emergency expenses for which there is no readily available source of funds; and to provide assistance, financial or otherwise, to the dependents at the time of an employee's death. These customs have been developing since the beginning of the company.

Retirement Fund

Because of current interest in retirement benefits, Swift's plan has been studied by several industries. Here, it is set up as a pension trust administered by a pension board. All employees of the company, and certain of its subsidiaries, who fulfill the requirements are eligible for retirement on pension. The minimum service requirement is 20 years of continuous service, and the retirement age for men is 65, for women, 60. Earlier retirements may be agreed to by the pension board.

The amount of pension is equivalent to 1.125 percent of each year's company earnings. The minimum to re-

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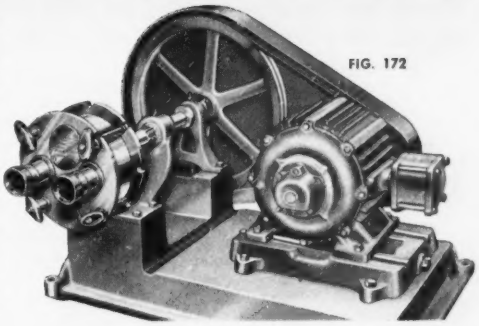

FIG. 172

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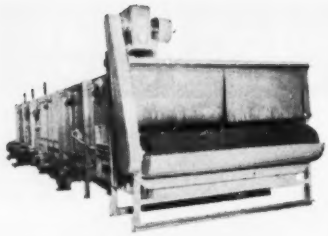

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tired employees is $360 a year, and the maximum is $12,000 a year. These payments are made in addition to the Federal Old Age Benefits for which the employee is eligible. Provisions also are made for pensions for the widows and orphans of eligible employees.

Good employee relations is a two-way street. In the final analysis, people are known by the company they keep, and a company is known by the people it keeps. If the best qualities of both the company and its people are perpetuated, the result is a successful enduring business carried on by competent, well-adjusted people.

It's Good Business

Swift & Co. considers employee relations activities as good, sound business. The degree of success that has been achieved is proof of that. The company buys its raw material in a highly competitive market and must pay the full market price to get livestock necessary to stay in business. It sells in a highly competitive market, and must sell at whatever price the consumer is willing to pay. There can be no holding for a better price. So success can come only through increased efficiency, and only competent employees can assure that efficiency.

Some time ago, the *Wall Street Journal* summed up the personnel factor in the following manner:

"Ask almost any meat packing executive where Swift's greatest strength is. He'll tell you it's the men who run the company. Here's how one of Swift's competitors put it: 'Swift has the best men in the industry heading each of its departments. On top of that, these executives are backed up by one or two men just about as good as they are.'"

—End—

Get Quicker Insect Count

—Continued from page 45

efficient. The logical solution seemed to be the use of the ordinary separatory funnel. However, on employing this unit, it became evident that it would be necessary to make a few modifications[4].

First of all, the opening at the top of a 2-liter separatory funnel is too small for convenient introduction of the sample. Second, the opening at the bottom of the funnel is also too small for the proper withdrawal of the pulp. Third, the angle of the ordinary Squip-type funnel is too steep to allow proper dispersion of the pulp. Moreover, this angle causes keystoning of the pulp as it is being withdrawn from the funnel.

To overcome these difficulties, we designed a special separatory funnel and had it fabricated in our own laboratory.

Components of the new funnel are: A 2-liter volumetric flask without a ground-glass stopper, an outer ground-glass joint with a 45/50 standard taper, a stopcock with an 8-mm. bore, and a ground-glass stopper with a 45/47 standard taper.

A student grade volumetric flask, without a ground-glass stopper, was used. This type of flask embodied the shape desired and it was the least expensive. The bottom was blown round and the other components were welded on. While these operations may be successfully accomplished by hand, a glass lathe greatly facilitates the fabrication.

Making Tests the Separatory Way

Now to the test steps: Either chop the sample of food into ¼-in. squares or force it through a No. 8-mesh screen. Weigh 100 to 200g samples in a 400-ml. beaker. The amount of sample will depend upon the level of contamination expected. For a highly contaminated sample, use 100g. And for a sample with a low contamination level, take 200g.

Flush the sample in the separatory extractor with the aid of a water-wash bottle. Add hot, deaerated water to the ¾-mark. For this purpose, 109.4 to 120.2-deg. F. water can be deaerated by allowing it to stand for a few minutes in an open container, or until all bubbles have escaped. Pour 50 ml. of No. 9 white mineral oil into the extractor, and then fill with hot water to the stopper level. Insert the stopper firmly and invert the funnel from top to bottom, while rotating slowly.

After 2 min. of mixing, put the funnel in a holder (a stand and a 5-in. dia. ring) for 3 to 5 min., depending upon the speed the oil rises. Drain all but about 50 ml. of the pulp and water layer from the funnel. Refill the funnel half-full of hot, deaerated water. Drain off the aqueous phase, and repeat washing until the oil is free of pulp. Filter the remaining oil and fragments directly into a 7-cm. Buchner funnel, fitted with a No. 4, 7-cm. Whatman filter paper. After filtration is completed, remove the paper and mount it on a 3x5-in. glass plate. Record the contamination with the aid of 30X wide-field Greenough-type microscope.

Comparing the Two Methods

This technic with the new funnel was then compared with the Wildman extraction method, using various fruits and vegetables.

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Food Industries

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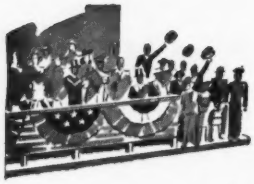

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In these checks, the spinach problem was noted. Here, the pulp tends to rise to a position just below the oil-water interface. Since the Wildman assembly is constructed so that a small amount of water must be trapped off with the oil, pulp is ultimately deposited on the filter paper, thus making inspection extremely difficult. A comparison of papers from the two methods (Fig. 1) shows less pulp with the separatory method.

Tomato pigment, being oil soluble, tends to color the filter paper, regardless of the method. And any pulp which is trapped off tends to complicate this problem. It is of utmost importance, under this condition, for the filter paper to be free of pulp. Fig. 2 offers a good comparison between the two methods for tomatoes.

The brightly colored nature of the individual receptacles in blackcaps—a berry—makes their removal from the trapped off portion of the extraction imperative. Failure of the Wildman method to accomplish this is demonstrated in Fig. 3.

The small conglomerate of cells in apple sauce tend to rise and, if removed with the oil layer, are deposited on the filter paper. This material oxidizes to a brown color and obscures the insect fragments. It is extremely difficult to obtain an accurate fragment count with this "muddy" layer of brown material (see Fig. 4).

Extraction of worm and insect fragments from whole corn is complicated because of the starchy nature of the product. The starch must first be digested by pancreatin enzymes or hydrochloric acid. Such digestion leaves empty seed coats, which rise to the oil-water interface, thereby making a clean extraction with the Wildman method improbable (Fig. 5).

Prune skins greatly resemble the skin of certain larvae. And any deposition of this material would be a confusing factor (Fig. 6).

A check was also made to find the comparative efficiency of the two methods in removing worm and insect fragments from duplicate samples. It was found that the separatory method recovered 20 to 25 percent more fragments than the Wildman technic. These figures are based on a wide variety of samples and different levels of contamination.

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The authors wish to express their gratitude to Kenneth Duggan, Food Technology Dept., Oregon State College, for the photographs used here.

—End—

Instead of Saving

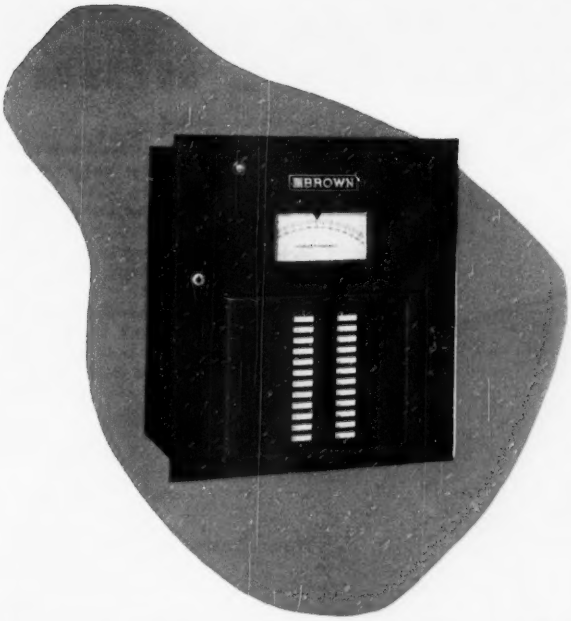
—Continued from page 81

cent of the vapors is essence. The partially concentrated fruit juice and the vaporized essence pass through a liquid-vapor separator. Vapors are conducted from the top of the separator to a fractionating column.

The juice passes from the bottom of the separator through a cooler enroute to depectinating tanks. After the pectin is removed, the juice is filtered and then goes to the vacuum evaporator. This concentrator, raises the juice Brix from the 12-14 original to a final 68, a 6-1 to 7-1 concentration. Temperature of the juice entering the evaporator is 140 deg. F. The evaporator is operated at 110 deg. F. It has a capacity 400 gal. of concentrate in 9 hr.

Water condensed from the vapors in the fractionating column collects in the bottom of the column and overflows into the sewer. Vapors are carried to a water condenser. Here, the remaining water in the vapor is condensed, as is most of the essence. Condensate and vapor then enter a separator, from which the vapors are conducted to another water-cooled condenser.

A measured amount of condensate is now drawn from the separator by a proportioner and pumped through a cooler into the top of the final condenser. The condensate that collects in the separator in excess of that removed by the proportioning pump overflows back to the top of the fractionating column for further separation of essence and water. The concen-



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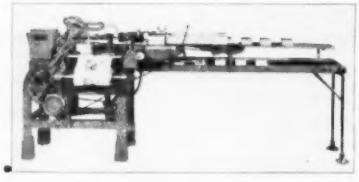

trated essence is collected in a tank and added to the batch of fruit juice after concentration in the vacuum evaporator.

How It's Merchandised

As stated, the new operation is now No. 1 at the company, with apple sauce down to second place. The various fruit juice concentrates made by this process are sold as such in bulk to other food processors for use in the manufacture of jellies, fountain syrups, and flavorings.

These concentrates are also prepared for the housewife, with the required amount of pectin put in to make jelly bases. Taking one of these preparations, the housewife adds water and sugar, then heats. Result is a table jelly featuring the true flavor of the fresh fruit or berry from which the base is made.

—End—

New Business Pioneers

—Continued from page 50

a manually operated refrigerated purge drum.

"Liquid supply to the continuous ice cream freezers is taken directly from the high-pressure receiver. The remainder of the liquid is drained off, through a high-pressure float valve, to the intercooler, with liquid pressure reduced to 30 lb. gage and a corresponding temperature of 16 deg. Resultant 'flash' gas goes directly through the third-stage compressor back to the condenser.

"A second float valve drains the intercooler liquid to the second-stage accumulator, reducing its pressure to 0 lb. gage and its temperature to 28 deg., with flash gas going through two stages of compression.

"The first-stage accumulator is supplied with surplus liquid from the second-stage drum, by means of a solenoid valve in the transfer line, actuated by a float switch on the oil-operated float control. There are two such oil-operated controls and indicators. Located in the compressor room, they show accurate levels in accumulators remotely located in cold storage. This represents the utmost in reliability and convenience.

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Continuous Mixing

—Continued from page 52

and reassembly takes about 1 hr. for an experienced operator.

Although the continuous mixer has a normal capacity of 1,500 lb. per hr., output may be varied from about 900 to 2,400 lb. hourly, depending on the pump speed, and by the type of batter being mixed. The work factor is varied by the back pressure maintained. When higher outputs are required, higher back pressures are used to get the work done on the batter and to incorporate the necessary air. For use by other bakers, the unit would have to be rated to the job requirements to some extent, and might have from one to four tubes.

Attention is directed to the accompanying data table on the different batters mixed. It is again stressed that these figures have to be fitted to formulation for optimum results.

Information is still being compiled from our daily work on continuous mixing. Although the picture is not fully complete, it is felt that most of the variables have been explored after a year and a half of experimentation, most of which has been on a volume basis.

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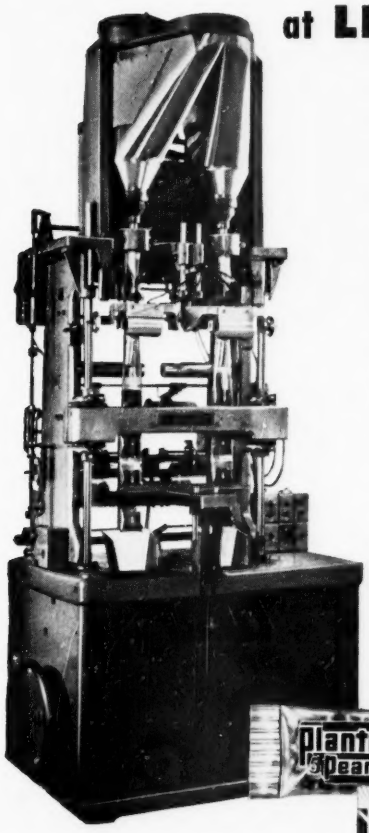

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In cost, the *finished filled* TRANSWRAP units actually run less than half the price of ready-made *empty* bags for manual processing. And, because a single operator can handle a whole battery of TRANSWRAP machines, wage savings are phenomenal.

TRANSWRAP is equally efficient for powders, solids, tablets and even liquids. Standard packaging materials which may be used include cellophane, Pliofilm, glassine, roll foil or other suitable heat-sealing materials. Package capacities range up to 80 cubic inches in volume and often may exceed one pound in weight. Custom-engineered adaptations are possible to meet your individual requirements with maximum efficiency.

Model "B" Transwrap with auger feed. Also adaptable to Volumetric or liquid feed. Produces 40 to 75 pkgs. per minute.

Also Available—
Model "A" Transwrap
For small and unit packages.
(2⅜" x 6" Max.) Speeds to 150 pkg/min.

WRITE FOR FREE ILLUSTRATED BROTHCHURE

Manufactured and Sold by

TRANSPARENT WRAP MACHINE CORPORATION

Route 17 and Henry Street, Hasbrouck Heights, New Jersey

Introducing the

These young Macks are out to beat their dads!

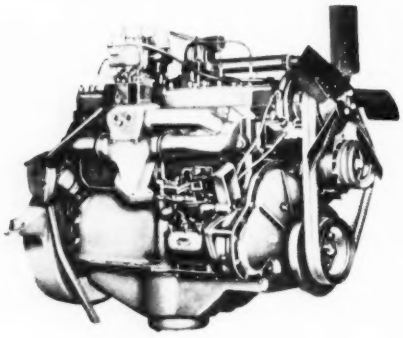
Their great-grandfathers are still at work—but these new Golden Anniversary Macks have everything that made their ancestors famous.

In these new Macks are all the built-in dollar-savers Mack is famed for—the greater stamina, greater strength that come from half a century of specializing in the development and the manufacture of commercial vehicles. All reasons why—"Mack outlasts them all!"

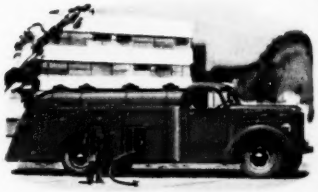
And introduced for the first time is the new *Magnadyne* Engine. Designed by Mack—it is completely Mack-built in Mack's own engine factory. A worthy running mate for a powerplant that is renowned among truckmen the world over—Mack's great *Thermodyne* Engine.

Whether you need a truck for dependable, economical city delivery or for the longest, heaviest hauling task—there's a Mack for you now. Small Mack or big Mack, a Mack will work for *less per year* and for *more years with less absenteeism*. One Mack or a fleet—your Mack branch or distributor has dollar-saving facts for you.

There's a Mack for your job with a great



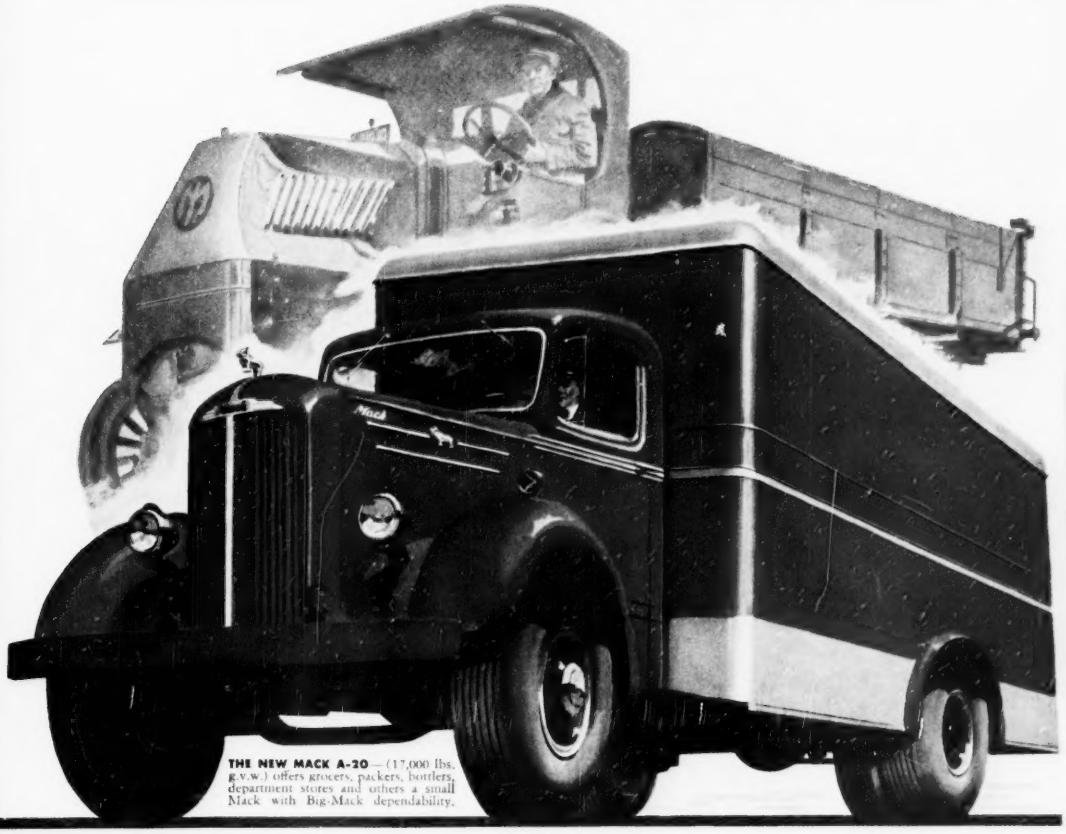
Originated by Mack, designed by Mack—completely Mack-built in Mack's new engine factory—the new *Magnadyne* Engine is money-saving news for truckmen. Mack-proved timing gears—gears that have never been known to wear out; the new triple-life manifold; directed jet-water cooling that increases valve life; a fully counterbalanced electrically case-hardened crankshaft—these and many other exclusive features and improvements add thousands of trouble-free miles, extra *working* miles, *earning* miles for Mack owners.



THE NEW MACK A-30—21,000 lbs. g.v.w.) is the dollar-saver Mack for oil dealers, lumbermen, farmers, stockmen and all truck operators who need a truck of the medium capacity class with Mack's built-in economy, stick-to-the-job stamina and Mack's ruggedness and long life.

Mack Trucks, Inc., Empire State Bldg., New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y.

Golden Anniversary Macks



THE NEW MACK A-20—(17,000 lbs. g.v.w.) offers grocers, packers, bottlers, department stores and others a small Mack with Big-Mack dependability.

Mack-built powerplant!

Built like a Mack . . . outlasts them all!

THE NEW MACK A-40—ranging in size from 24,000 lbs. (g.v.w.) to 45,000 lbs. (g.c.w.)—is (1) a highways type for long hauls, (2) a dump truck, (3) a six-wheeler and (4) a tractor. The new A-20, A-30 and A-40 Macks bring Mack economy to virtually every hauling task a truck is asked to do.

THE NEW MACK A-40S—a six-wheeler Mack—is one of the huskies among these new Golden Anniversary models. Big job or little job—whatever your hauling task may be—turn it over to a tough, rugged Mack. See your Mack branch or distributor—or ask a representative to call.

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Modernize with Mack!

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Make the most of these fine products...

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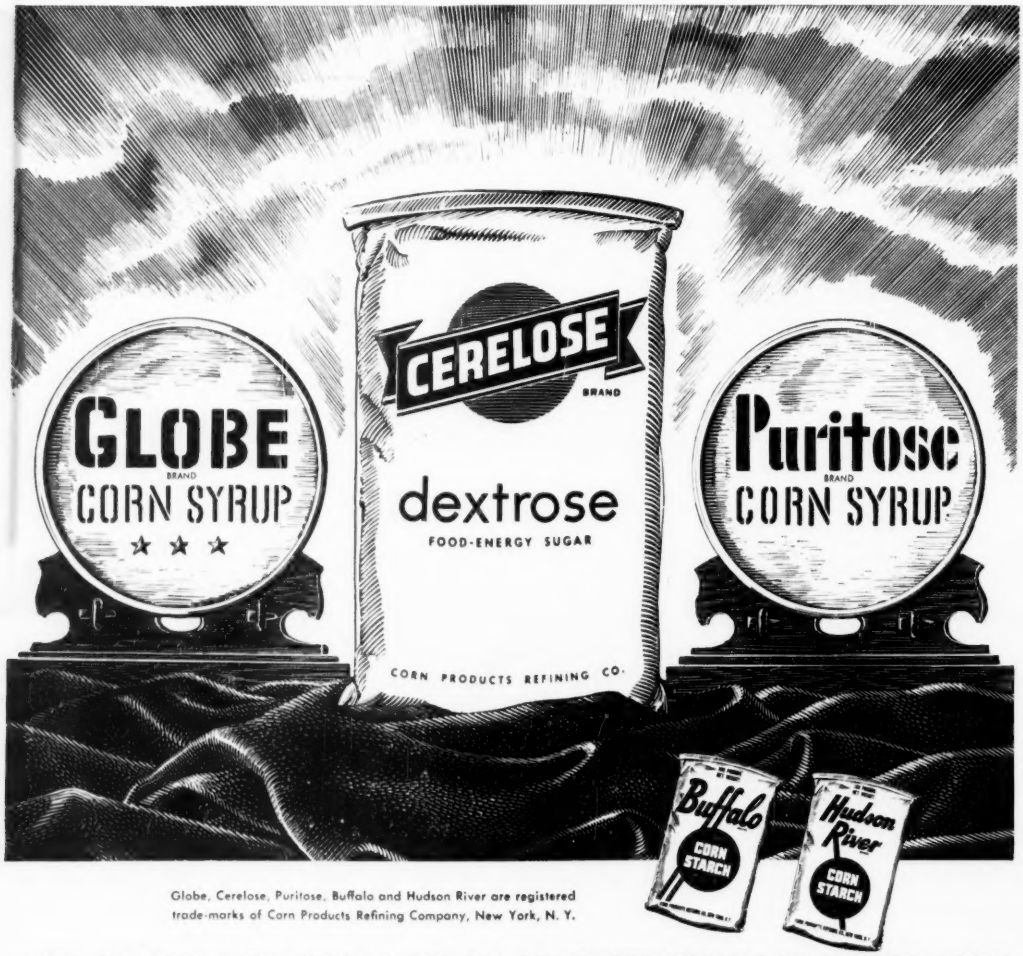

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CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

"But you can't buy that kind of a motor..."

P-14A

How many times have you heard somebody that ought to know better say something like that about motors, pumps, compressors or what-have-you? And how many times have you heard somebody else say, "Oh yes you can! I saw just what we need in Blank Company's ad yesterday." Advertising pages in this magazine are packed with *news* about your business. They contain information about products and services designed to help *you* do your job quicker, better and cheaper. To be well-informed about the latest developments in *your* business, *your* industry... and to stay well-informed... *read all the ads too.*

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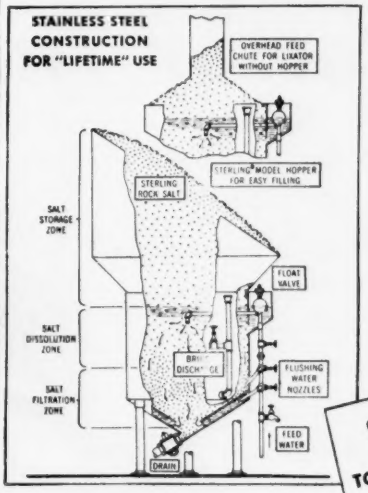
SALT! WHY HAUL IT? MEASURE IT? STIR IT?



Just Turn It On!

STERLING ROCK SALT BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT

- FLAVORING • WASHING • SOAKING
- BLANCHING • GRADING • BRINE PEELING
- ZEOLITE WATER SOFTENERS • PICKLING

HOW LIXATOR WORKS

In the dissolution zone – flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone** – through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

• You can eliminate shoveling, hauling, and laborious hand stirring of salt and water, and frequent testing of the brine strength — with International's Lixate Process for Making Brine. Stops waste through spilling. Saves time and labor. Assures accurate salt measurement.

• The Lixator *automatically* produces 100% saturated, free flowing, crystal-clear brine — which may be piped to as many points in your plant as you desire — any distance away — by either gravity or pump. YOU SIMPLY TURN A VALVE for self-filtered, LIXATE Brine that meets the most exacting chemical and bacterial standards.

An INTERNATIONAL Exclusive

The LIXATE* Process

FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

NATIONAL CANS

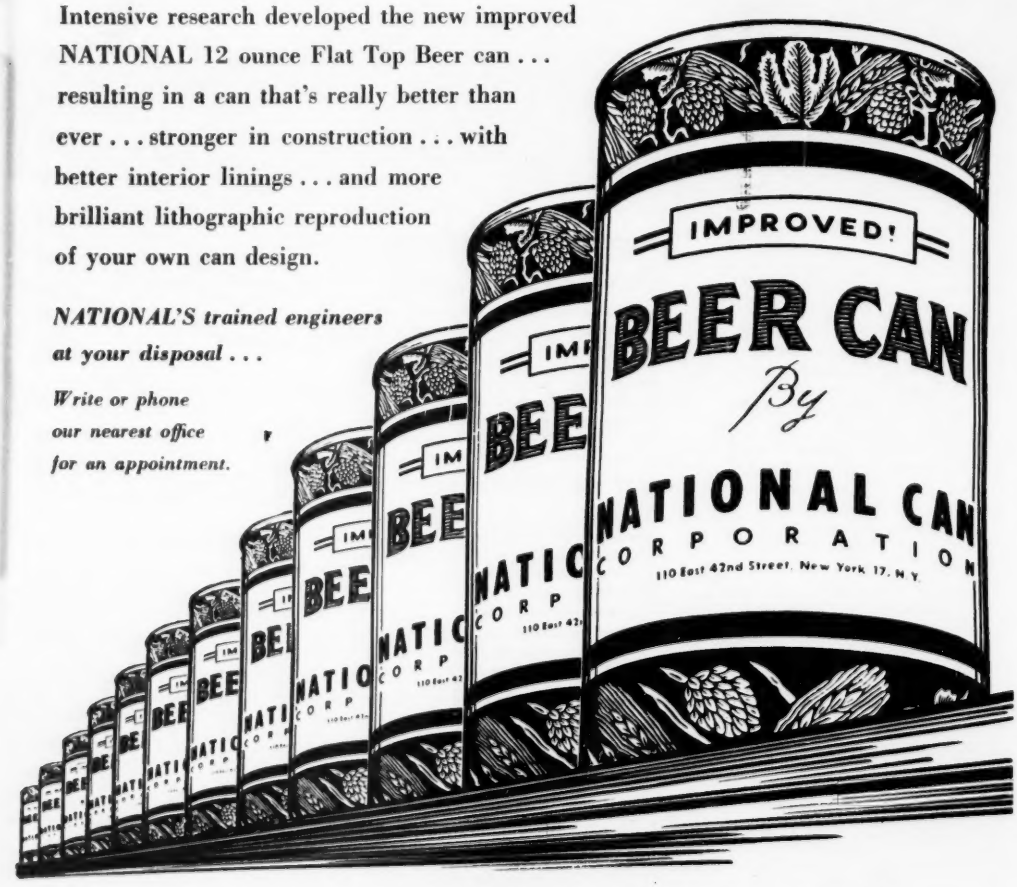
Rolling Again - - -
Better Than Ever

Yes — NATIONAL'S Beer cans are rolling again . . . better than ever . . . and more of 'em.

Intensive research developed the new improved NATIONAL 12 ounce Flat Top Beer can . . . resulting in a can that's really better than ever . . . stronger in construction . . . with better interior linings . . . and more brilliant lithographic reproduction of your own can design.

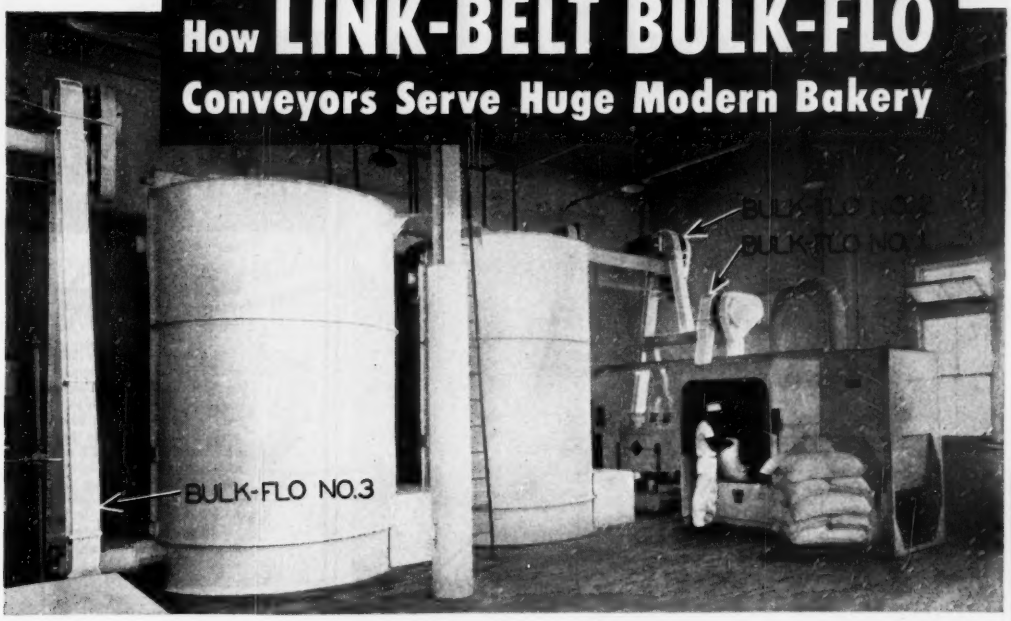
NATIONAL'S trained engineers at your disposal . . .

Write or phone our nearest office for an appointment.



NATIONAL CAN
CORPORATION
110 East 42nd Street, New York 17, N. Y.

How LINK-BELT BULK-FLO Conveyors Serve Huge Modern Bakery

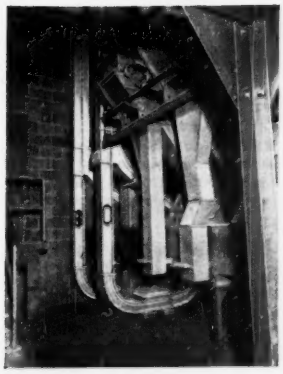


Baking 6000 pounds of bread an hour, the new automatic plant of Fuchs Baking Company, South Miami, Florida (designed and built by Baker Perkins, Inc.) relies on highly efficient Link-Belt Bulk-Flo conveyors to handle the large quantity of flour consumed. In the view above, attendant is emptying a sack of flour in sack cleaner and blender, from which a screw conveyor feeds looptype Link-Belt Bulk-Flo elevator No. 1 for discharge into a gyratory sifter.

Link-Belt Bulk-Flo No. 2 carries flour from sifter to two steel storage bins, of 90 bbl. capacity each, by way of an overhead screw conveyor.

Flour is reclaimed from bins by screw conveyor and Bulk-Flo No. 3 from which an overhead screw conveyor carries it to a second sifter, on the way to the mixers.

◀ **LINK-BELT BULK-FLO conveyors give excellent performance** handling sugar, flour, soybean meal and a wide variety of other free-flowing materials. Completely enclosed in a dust-proof casing, Bulk-Flo provides gentle handling with minimum degradation. It is self-loading, self-discharging and largely self-cleaning.



Above, section of Bulk-Flo vertical run showing peak-top flights in dust tight casing.

•

Foot end of two Bulk-Flo elevators, loop loading type, handling blended flour from storage tanks to packaging on upper floor, in prepared flour mill.

You are invited to discuss the Bulk-Flo way of handling materials with a Link-Belt engineer. Ask now, for Book No. 2175.

LINK-BELT COMPANY

Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities. 11,981

LINK-BELT

BULK-FLO

Elevator-Conveyor-Feeder

3 Ways Better
BUFFALO Conveyor BELTS

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MADE TOUGHER

The basic yarn from which these solid cotton belts are woven is the first important requirement . . . and Buffalo ONLY buys the BEST! This *better* yarn forms the backbone of the conveyor belts made by our WOV-IN-WEAR PROCESS.

they're
WOVEN TIGHTER

WOV-IN-WEAR is a unique belt weaving process that is our own EXCLUSIVE development. From our more than 50 years of experience, we have learned how to weave under HIGHER TENSION and the end result was a NEW kind of loom and a BETTER, TIGHTER WEAVE.

they
LAST LONGER

When you combine BETTER yarn and a BETTER weaving process . . . greater strength and longer wear is the natural outcome! That's why people who have used Buffalo Belts down through the years, say: "When you buy Buffalo . . . you're buying the BEST!" P.S. YOU DON'T PAY A CENT EXTRA FOR BUFFALO QUALITY.

OVER 200 SIZES
35 WIDTHS
7 THICKNESSES

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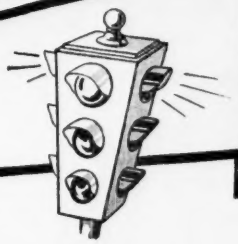


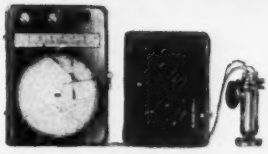
Bristol's pH Controller-Recorder puts plant waste neutralization on continuous, accurate, economical basis

If you are now neutralizing plant wastes manually —or are considering the installation of a neutralization system, a Bristol pH Controller-Recorder can standardize your results . . . prevent corrosion losses . . . utilize chemicals with maximum economy and safeguard stream and river purity.

A typical installation involves:

- a Bristol pH Controller-Recorder which continuously measures the pH of plant wastes and controls the flow of reagents to the mixing chamber to achieve a neutral value —
- and a Bristol Recording Flow-Meter which measures the volume of material to be treated, records the variations in the rate of flow and totalizes flow for record and cost-figuring purposes.

These Bristol Instruments are carried in stock for immediate delivery. Write for further information. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 91, Connecticut.



Bristol Continuous pH Controller-Recorder

TYPICAL UNIT CHEMICAL-PROCESS APPLICATIONS FOR BRISTOL pH INSTRUMENTS

Neutralization . . . to show when reagents have carried reaction to desired pH value.

Coagulation . . . to indicate when optimum pH value is attained.

Precipitation . . . to insure complete precipitation and proper physical properties of precipitate.

Fermentation . . . to insure that material remains within the critical pH range for maximum action.

Electro-deposition . . . proper pH determines efficiency of base metal plating.

Other Applications . . . crystallization . . . absorption . . . filtering . . . bleaching . . . settling. *Write for facts.*

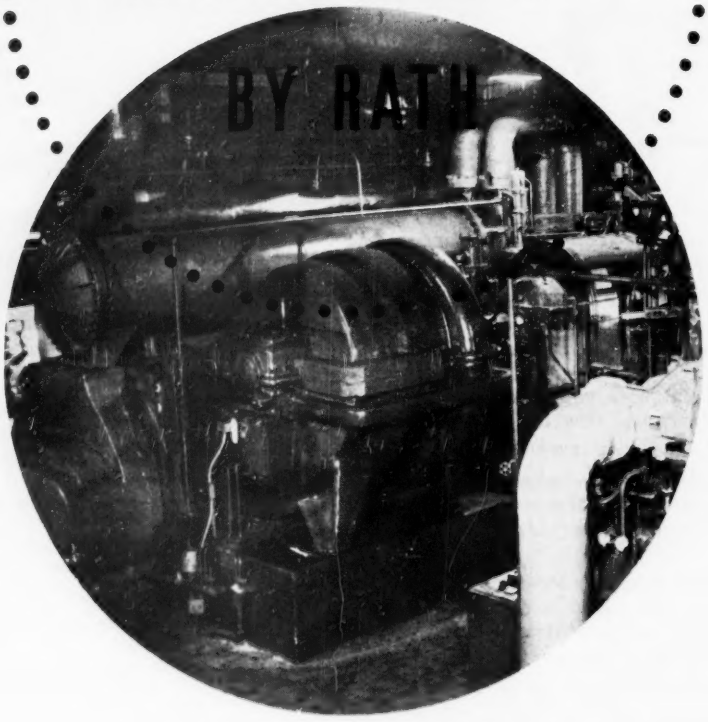
Bristol makes a complete line of instruments for controlling sewage and industrial waste disposal processes, including recording thermometers, liquid level instruments, flowmeters, pH instruments, recording gauges, pyrometers, telemetering instruments, and automatic controllers.

BRISTOL

Engineers process control for better products and profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

"PROVED SATISFACTORY" BY RATH



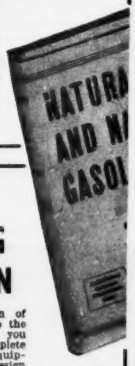
The Rath Packing Co., Waterloo, Iowa, is operating 3 Carrier Centrifugal Refrigerating Machines. These machines add no oil to the ammonia used for refrigeration. They are powered by steam turbines which are fitted into the plant heat balance. Mr. John S. Bartley, Rath Chief Engineer, says that they "have proved to be satisfactory."

No wonder. Carrier Centrifugal Refrigerating Machines are compact—provide more cooling in less space. They are efficient—they add no oil to the refrigerant to reduce refrigerating effect. When powered by available steam, power for refrigeration costs almost nothing.

The Carrier Centrifugal Refrigerating Machine will chill directly any liquid, will condense vapors, and will attain temperatures as low as minus 150 degrees F. It is available in capacities 1200 tons and larger. It could be your best investment. Carrier Corporation, Syracuse, New York.

Carrier AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

NATURAL GAS AND NATURAL GASOLINE



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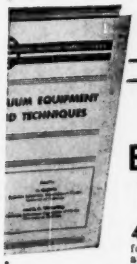

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Pays off in 3 Ways

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ACCELERATES PRODUCTION Takes the slowing up "lags" out of assembly line movement. One man precision "spotting". Speeds up handling in shipping.

IMPROVES PLANT MORALE Saves the backs and muscles of men so that they may produce with "morning" efficiency in late afternoon. Aids in accident control.

Frankly, we don't know how many factories have cut costs by putting CM Electric Hoists on production jobs, but we **do know** they keep coming back for more and more Meteors and Comets. You couldn't ask for more convincing evidence of a product's usefulness to industry than a constantly growing demand.

CM Meteor and Comet advantages are fully described in the complete CM Catalog. Write us for a copy and the name of your local distributor.

CM COMET High speed, sturdy, portable electric hoist. One hand control. Plug in on single or 3 phase power line. Capacities: ⅛ to 1 ton.

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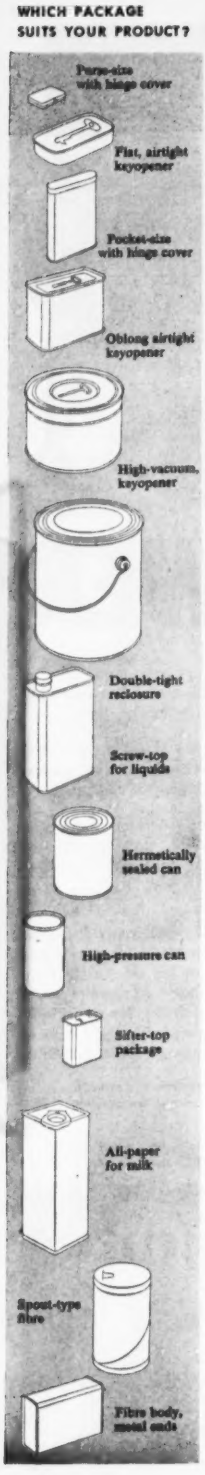
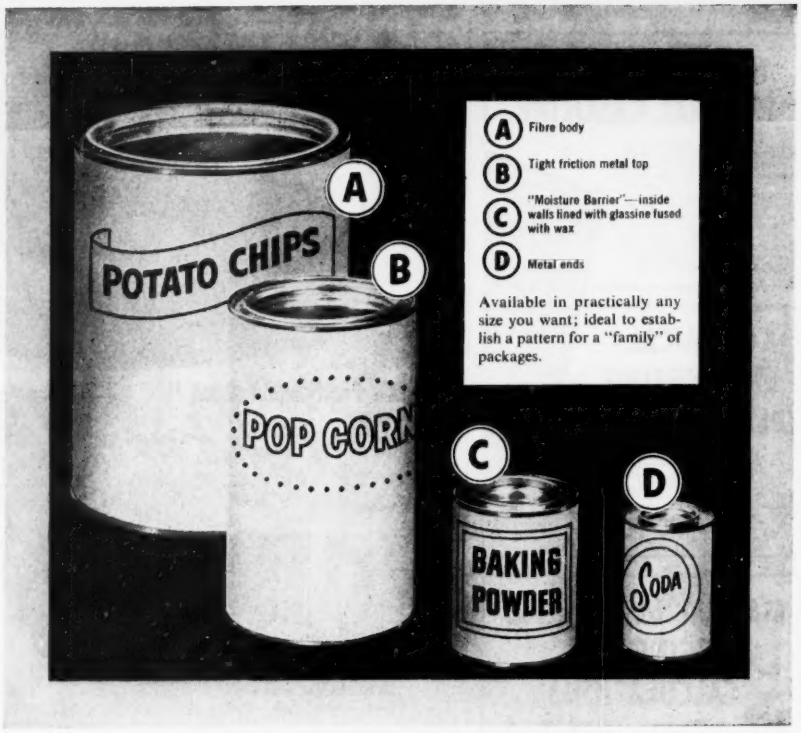




WANTED: New customers for a top-notch salesman!

The inside walls of this container are lined with glassine fused with wax to provide a barrier that keeps inside moisture in . . . and outside moisture out.

Primarily, it is an excellent package for *any* dry, powdered product or one needing protection against moisture.

You'll run out of fingers!

Start ticking off some of the products for which this container is suitable and watch how the list mounts.

In the food field there's baking powder, crackers, popcorn, potato chips, powdered milks, gelatines, and a variety of cake and biscuit mixes.

In the drug field you can make quite a list, too. It's ideal for bath salts, epsom salts, bicarbonate of soda, insecticides, boric acid, senna leaves, sulphur powder, sodium fluorite, flaxseed and Glauber's salt. In other words, it's a possibility for quite a few dry pharmaceutical products and proprietary remedies.

The container fills fast and ships light. It comes in a wide variety of sizes. It is easy to stack and easy to handle.

Can't miss the label!

There's plenty of "front" for your label and it has a tight friction metal top (easy to open—closes snug) with a wide aperture for free pouring or dispensing.

Is your product a new customer for this salesman?

AMERICAN CANCO CAN CO.
NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON CANADA

FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

$127.50 Monthly Profit from Orange Oil Formerly Lost

(reported by J-M Engineer H. G. Martin)

LOS ANGELES DISTRICT: A citrus processor in my territory uses high-speed centrifuges for orange oil recovery. After two weeks' operation, there is an accumulation of about 100 gallons of sludge, which has a high content of orange oil. Settling and decanting this sludge yields 75 gallons of oil. By adding Celite to the remaining 25 gallons of heavy sludge formerly discarded and then pressing it, 5 more gallons of orange oil are recovered. Selling for $1.50 per pound, this means a saving of $130.00 in additional orange oil per month. Deducting $2.50 for the cost of Celite used, the operation shows a monthly net profit of $127.50.

Sales Appeal Improved with Celite 545

(reported by J-M Eng. W. A. Reschke)

CHICAGO DISTRICT: A trial run convinced this customer that he had much to gain and nothing to lose by using Celite as a pressing aid in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Previously, without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. Customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a considerably longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite 545 to each 900-lb. batch of grapes pressed.

Filter Trouble Corrected with Hyflo*

(reported by J-M Engineer R. J. Amberg)

DETROIT DISTRICT: A wine company reported trouble with a new filter which they had installed recently and I was called in to assist.

The problem was to handle the settlings from several thousand gallons of wine without increasing the amount of filter aid which they had been using. The wine is pumped from the main cask to a 260-gallon mixing tank and from there to the filter. There are no facilities for pre-coating with anything but unfiltered wine. We put ten pounds of Hyflo in 200 gallons of wine in the mixing tank and circulated this until clarity was obtained. This was a matter of only a few minutes. The clear filtrate was then turned to a receiving tank. The flow rate was estimated at 6 gallons per square foot of filter area per hour after filtering about 200 gallons.

*T. M. Reg. U.S. Pat. Off.

Engineering Help Solves Filtration Problem

(reported by J-M Engineer G. F. Huber)

BOSTON DISTRICT: One of my customers was having difficulty due to the filter powder coming through the ceramic filter medium. I checked the operation with their technical director and found that incomplete venting of the air from the filter body during precoating permitted air to remain trapped in the upper part of the filter. This prevented the precoat suspension from filling the filter and depositing an even coat upon the stone. As the filtration was continued, the liquid level in the filter rose and gradually displaced the air but meanwhile, of course, some filter aid passed through the stone.

I suggested complete air venting at the start of the precoating and installing a valve on the outlet side. This change in operation resulted in a decided improvement and, needless to say, the customer was greatly pleased.

Your New Problem may be an old one to the CELITE Engineer

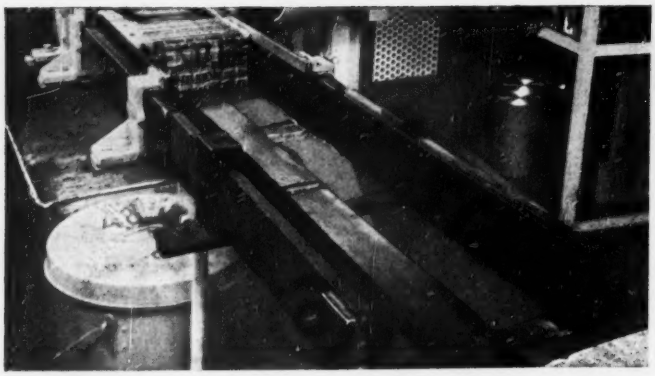
These case histories show not only what Celite Filter Aids can do but also how Johns-Manville Filtration Engineers can help you. Small, simple changes in equipment or technique often lead to big results because J-M Engineers combine scientific knowledge with wide practical experience on many filtration problems. In addition, they have access to the resources of the J-M Research Laboratory where modern filtering techniques and filter aids were developed.

For additional information, write Johns-Manville, Box 290, New York 16, New York.

Johns-Manville JM PRODUCTS

***Celite* Filter Aids**

Reg. U. S. Pat. Off.



Combine SALVAGE with REPLACEMENT

To Reduce Maintenance Expense

PETER CAILLER KOHLER CAPITALIZES ON VERSATILITY OF FULLERGRIPT BRUSH STRIPS

When only a portion of a brush wears out, must the entire brush be discarded? The answer is, for one food manufacturer, "no".

At the Peter Cailler Kohler plant in Fulton, N. Y., two stationary brushes are used on each chocolate bar packaging machine to hold wrapper ends firmly in position until the adhesive sets. As the chocolate bars pass between these brushes, the brush material is worn in grooves.

The maintenance men at Peter Cailler Kohler discarded the stationary brushes formerly used and built frames to hold Fullergript brush strips. With these frames it is now easy work to remove a worn strip and slide a new one in its place. Also, the wear has been retarded — thanks to the triple density of Fullergript strips, where brush material is packed continuously in a metal channel.

Fullergript brushes, either in strips or fabricated into power brushes, are widely used in packaging machinery. Many economies have been secured when Fullergript was found to answer packaging production problems. Find out how our engineers can be of similar help to you. Merely write for our booklet, "Fullergript Power Brushes".

DO YOU REQUIRE A SPECIAL MACHINE FOR A BRUSHING OPERATION?

You can benefit from our wide experience in designing and building special brushing machines. No obligation to lay your problem before our engineers.

FULLERGRIPT — The FULLER BRUSH CO.

INDUSTRIAL DIVISION
3640 MAIN STREET
HARTFORD 2, CONN.

Here's Why it Pays You to Read the Advertising

The advertising is a rich source of valuable information. In this magazine it offers you ideas and products that may well apply advantageously to your business.

Every issue is a catalog of goods, materials, and services — quickly available to you — just for the reading.

Leaders in business and industry turn to the advertising because they've discovered it helps them run their businesses more profitably.

When you read all the ads in this magazine, the chances are good that you'll get a lead that will materially help you do a better job. For example, you may find a specific piece of equipment that will be a profitable time-saver. Or a tool that will increase worker efficiency. That's why it pays to read the advertising. It's good business.

HEADQUARTERS FOR BUSINESS INFORMATION

McGRAW-HILL publications

NO MATTER { *what kind of food products you pack...* / *what form of seasonings you now use...*

you can IMPROVE the flavor of your products with
MM&R SPICE OILS, the MODERN Method of FLAVOR CONTROL

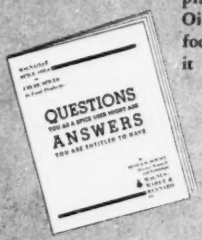
It's true as you're reading this that no other method of flavoring can give your products *all* the advantages of liquid Spice Oils... and no other Spice Oils can match the purity, the uniformity, the *economy* of MM&R MAGNATEST Spice Essential Oils.

It's easy to *test* the advantages of MAGNATEST Spice Oils in a sample batch. For full information, write the MM&R Technical Service Dept. today.

13 reasons why
MM&R MAGNATEST SPICE OILS WILL GIVE YOU BETTER RESULTS

1. more economical (flavor **more** batches at **lower** cost per batch)
2. make it possible to flavor your product uniformly
3. cannot cause discoloration
4. do NOT mold
5. release 100% of flavor immediately
6. prevent introduction of rodent excreta, hair or pellets, insects or insect fragments, etc.
7. always constant in flavor value
8. easy to measure in exact quantities
9. take up less storage space than crude spices or flavored salt or sugar
10. decrease freight expense
11. prevent losses due to exposure during storage
12. easy to blend
13. prevent overflavoring of prepared food products during shelf life

FREE! An important technical paper—"Questions and Answers", that will give you a clear and complete picture of the place of Spice Essential Oils in the flavoring of food products. Write for it now!

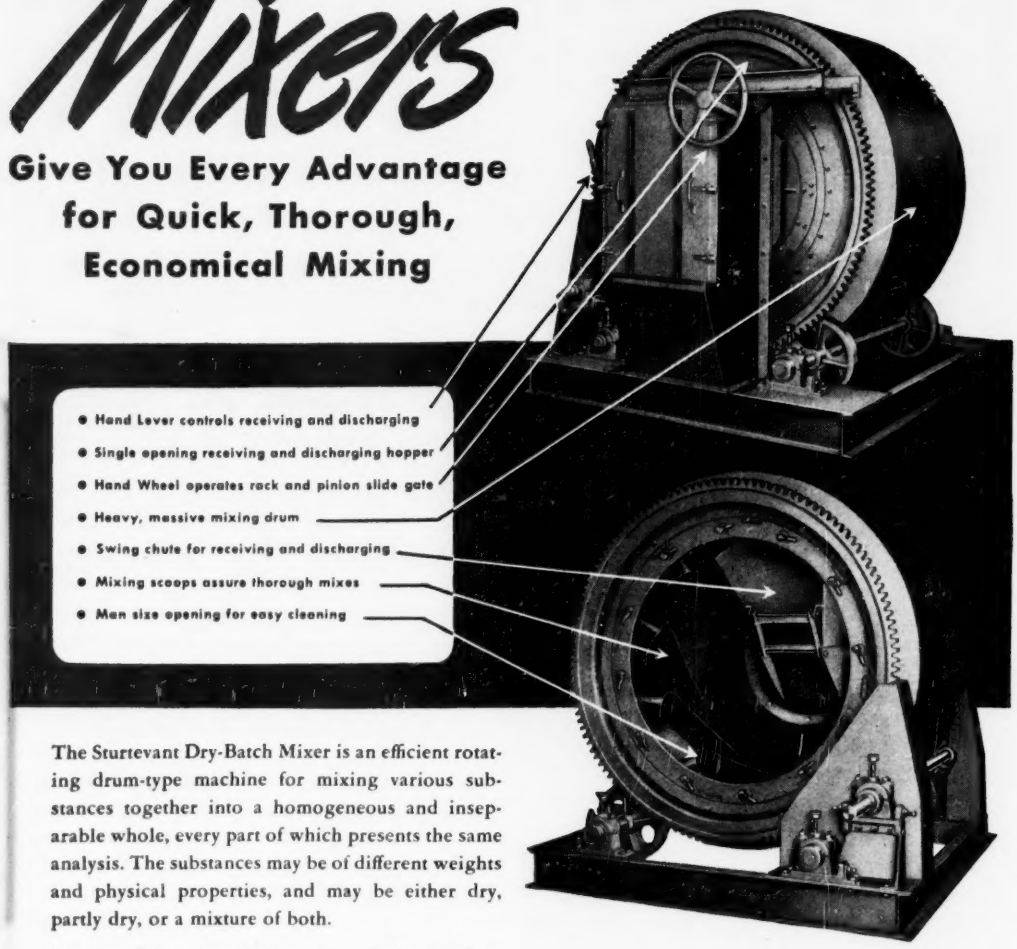


MAGNUS, MABEE & REYNARD, INC.
SINCE 1895... ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS
15 DESBROSSES STREET, NEW YORK 13, N. Y. • 221 NORTH LASALLE STREET, CHICAGO 1, ILL.
LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS AND ROGERS, INC. • SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

Sturtevant Dry Batch

Mixers

Give You Every Advantage for Quick, Thorough, Economical Mixing


• Hand Lever controls receiving and discharging
• Single opening receiving and discharging hopper
• Hand Wheel operates rack and pinion slide gate
• Heavy, massive mixing drum
• Swing chute for receiving and discharging
• Mixing scoops assure thorough mixes
• Man size opening for easy cleaning

The Sturtevant Dry-Batch Mixer is an efficient rotating drum-type machine for mixing various substances together into a homogeneous and inseparable whole, every part of which presents the same analysis. The substances may be of different weights and physical properties, and may be either dry, partly dry, or a mixture of both.

Because of the unique design of its mixing chamber, and the 4-way mixing action which brings two or more substances together, the Sturtevant Dry-Batch Mixer does a more rapid mixing job than other machines and, at the same time, it is complete and thorough in every particular.

Write for bulletin today.

Compare These Advantages

- Only one lever controls both receiving and discharging for simplicity of operation. Hand wheel operates rack and pinion slide at feed opening.
- 4-way mixing action speeds production...assures thorough blends.
- "Open-door" accessibility permits easy, fast, thorough, cleaning.
- Single aperture drum for both intake and discharge.
- Unusually efficient scoops pick up materials to effect thorough mixing as drum revolves.
- 5 models . . . a size for every mixing job . . . smallest size mixes up to 7½ tons per hour . . . largest size up to 75 tons per hour.

STURTEVANT MILL COMPANY

106 Clayton Street, Boston 22, Mass.

Designers and Manufacturers of:

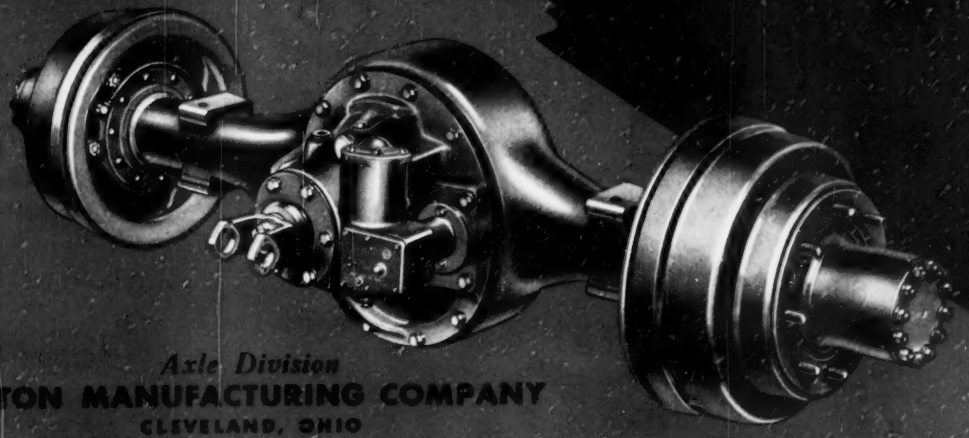
CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
ELEVATORS • MIXERS
MECHANICAL DENS and EXCAVATORS

EATON

2-Speed Truck AXLES pay for themselves seven different ways

Faster Trips · More Pay-Load Miles
Longer Truck Life · Lower Operating Costs
Lower Maintenance Costs
Less Shop-time · Higher Trade-in Value

The advantages which Eaton 2-Speed Axles contribute to truck operation are made possible because they double the available number of gear ratios. With a flick of his finger, the driver can select a ratio best suited for pulling power or speed. This reduces strain and wear on engine and truck, cuts gas and oil consumption, saves running time. Ask your truck dealer to prove that Eaton Axles more than pay for themselves. Available for most trucks of the 1½-ton class and larger.

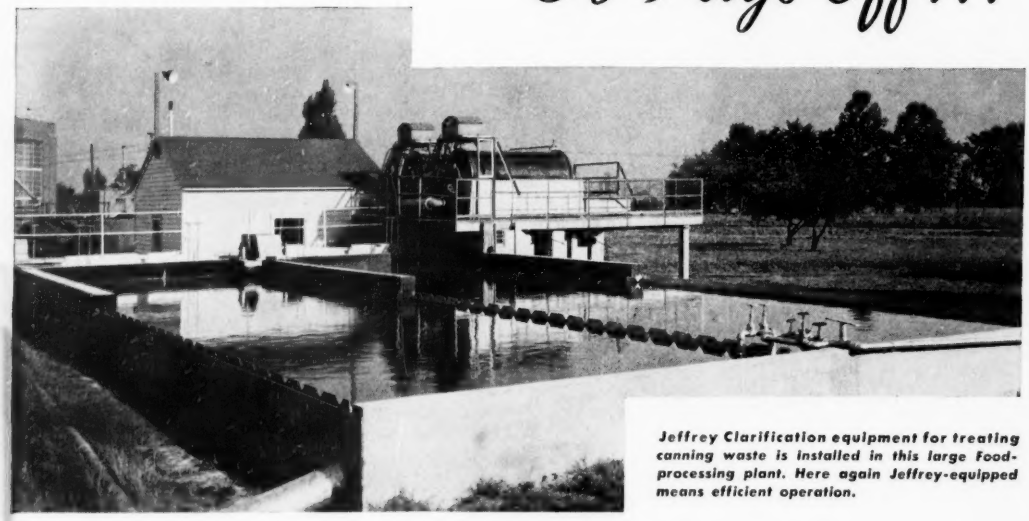


Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

EATON PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

TREAT **INDUSTRIAL WASTE** *RIGHT*

It Pays Off...



Jeffrey Clarification equipment for treating canning waste is installed in this large Food-processing plant. Here again Jeffrey-equipped means efficient operation.

Industrial Waste is the Peck's Bad Boy in nearly every plant . . always in bad with the neighbors as well as State Pollution Control Commissions.

Clarification of industrial waste need not be such a bad problem. Jeffrey has the facilities for proper and efficient waste treatment . . can help you keep the nation's waters clean. For meeting exacting specifications we can furnish Collector mechanisms for Grit Chambers and Settling Basins, Screens, grease and oil Skimmers, Flocculation equipment, etc., backed by years of experience in designing and building the best in Sewage and Water treatment equipment.

We will be glad to send you some of the names of outstanding plants in which Jeffrey equipment is doing a real job on the purification of sewage and concentrated organic wastes . . and paying off. May we hear from you?

Bar and Disc-type Screens
Sludge Collectors
Sludge Elevators
Grit Washers and Collectors

FLOCTROLS (controlled flocculation)
Equipment for Biofiltration plants
Transmission Machinery
Scum Removers
Garbage Grinders

Chemical Feeders
Screenings Grinders
Belt and Spiral Conveyors
Chains and Sprockets

THE JEFFREY MANUFACTURING COMPANY

Established 1877

927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

JM

Baltimore 2
Birmingham 3
Boston 16
Buffalo 2
Chicago 1
Cincinnati 2
Cleveland 13
Denver 2
Detroit 13
Harlan
Houston 2
Huntington 19
Jacksonville 2
Milwaukee 2
New York 7
Philadelphia 3
Pittsburgh 22
St. Louis 1
Salt Lake City 1
Scranton 3

Jeffrey Mfg. Co., Ltd., Head Office & Works: Montreal

"We supply 29 STALLINGS' RETAIL SHOPS with 200 Varieties of Baked Goods from our ALL-GAS BAKERY"—

J. Alan Stallings, Production Manager

WITH A LINE OF 200 VARIETIES of Baked goods, including bread, cakes, rolls, cookies, sweet rolls, etcetera, Stallings requires a wide range of temperatures for baking and other food processing operations. For each requirement, GAS and modern Gas Equipment fill the bill.

Yet the controllability of GAS, and the simplicity of the equipment make possible the supplying of 29 Retail Shops from Stallings' central baking plant, using a minimum of equipment. This includes one Fish rotary oven, two Baker Perkins tray ovens, nine sections of proof boxes supplied with steam from Eclipse and Cyclotherm Gas Boilers which also supply steam for processing.

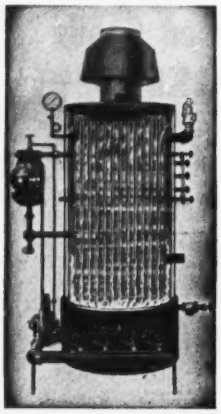
Commenting on the problems involved in production planning for the group of Stallings' Retail Shops, Mr. Stallings says, "**With our flexible Gas Equipment we can change our baking schedules to satisfy customer demands for any type of goods. There's no delay in making these changes because GAS is fast enough to provide proper temperatures in any of our ovens by the time we're ready to bake. The cleanliness of the fuel is important, too, because it keeps our clean-up time at a minimum.**"

Whenever and wherever you want to take a look at the record, GAS is the standout heat source for baking and food processing. NOW is the time to ask your GAS Company Representative for proof.

STALLINGS COMPANY, Glassport, Pennsylvania, central baking plant for 29 STALLINGS Retail Bakery Stores.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVE., NEW YORK 17, N. Y.

MAXIMUM AUTOMATIC STEAM
IN *MINIMUM* FLOOR SPACE . . .



The Kane Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

the Kane Boiler Package

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job,—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: The correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

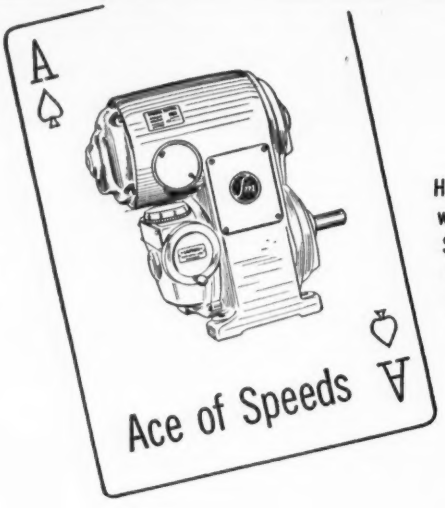
Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE



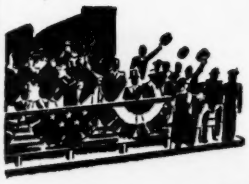
Hit the jackpot with Sterling Speed-Trol Electric Power Drives

STERLING
ELECTRIC MOTORS

PLANTS: NEW YORK 51, LOS ANGELES 22, HAMILTON, CANADA—OFFICES IN PRINCIPAL CITIES

Write for Bulletin

SPEED-TROL (Variable Speed) • SLO-SPEED (Geared) • KLOSED (Normal Speed)



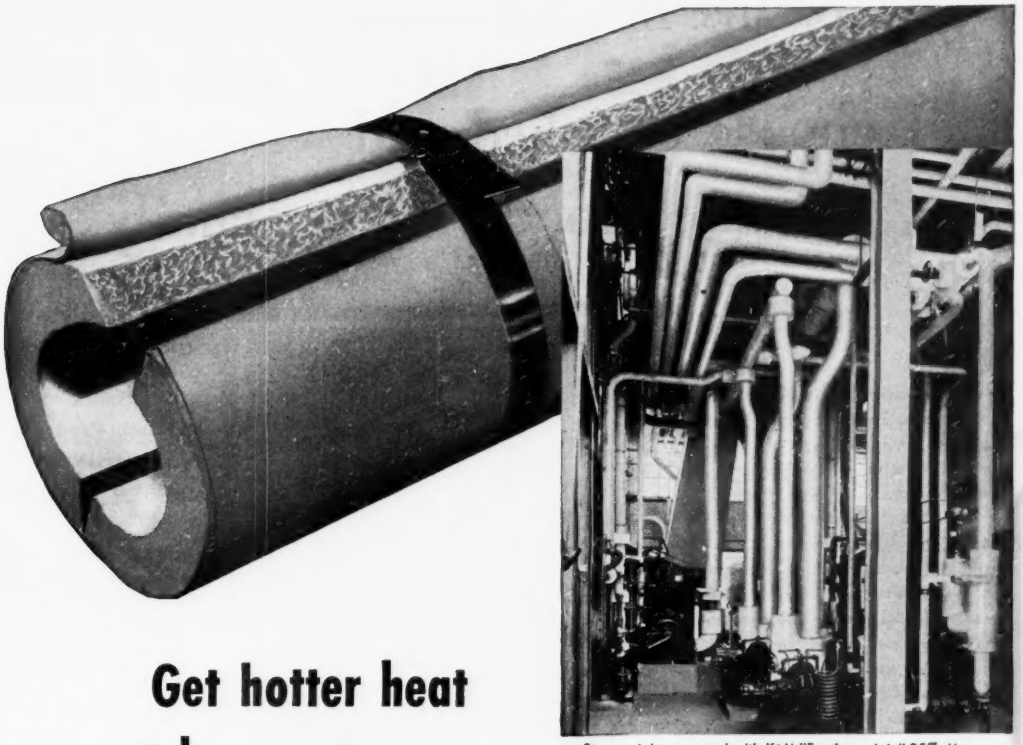
HERE'S A

Parade

YOU WON'T WANT TO MISS...

Everybody loves a parade but here's one that's particularly interesting to YOU because it's packed with "pocket-book" appeal. It's a never-ending parade of products and services designed to help you do *your* job better, quicker and cheaper. You're in the "reviewing stand" for this parade because it comes to you in the advertising pages of every issue of this magazine. Alert manufacturers use these advertising pages to get the *news* about their products and services to *you* . . . quickly and effectively. To be well-informed about the latest developments in *your* industry . . . and to stay well-informed . . . , *read all the ads too.*

McGRAW-HILL PUBLICATIONS



Steam piping, covered with K&M "Featherweight" 85% Magnesia, in Standard and 1½" thicknesses; canvas covered.

Get hotter heat at less cost with K&M "FEATHERWEIGHT"® insulation

Keep heating costs down—and heating efficiency up—with K&M "Featherweight" 85% Magnesia Insulation. 85% Magnesia is the most widely accepted insulating material in its field. And in K&M "Featherweight," basic carbonate of magnesia is combined with selected and specially processed asbestos fibers to produce a highly efficient insulation of extremely low thermal conductivity.

K&M "Featherweight" withstands temperatures up to 600° F. without loss of insulating value. And, though it's amazingly light in weight, it is strong and durable also. It can withstand vibration, a reasonable amount of compression, and its insulating properties are not affected by alternate wetting and drying. As it is entirely mineral by nature, it cannot burn.

"Featherweight" 85% Magnesia insulation is easy—and economical—to apply. It can be stored and handled without any special precautions. No special tools are needed to apply it: "Featherweight" is easily sawed and cut; can be fitted snugly to contours without breaking apart.

K&M "Featherweight" 85% Magnesia is furnished for all standard pipe sizes in sections and in sets of segments 3 feet long in the following thicknesses; Standard, 1½", 2", double standard (broken joint) and 3" (broken joint). Blocks and lagging are also available for irregular surfaces. Ask your K&M Distributor for complete information, or write us direct.

K&M best in asbestos®

Nature made Asbestos . . . Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

★ ★ ★ *Ask Mrs. Homemaker—she'll tell you* ★ ★ ★

"I choose enriched and fortified foods for my family"

AMERICAN housewives enthusiastically endorse the Food Industry's program of enrichment and fortification. More and more, they select *enriched* and *fortified* foods for their family tables.

And their judgment has again been proved correct by the results of the large-scale Newfoundland Nutrition Surveys. These studies reaffirmed that enriched and fortified foods promote *healthier* bodies, sharply reduced infant mortality, lower tuberculosis and over-all death rates — improvement in both the quantity and quality of life.

When you enrich or fortify with Merck Vitamin Products you *know* that the faith of millions of American women is fully protected. Merck Vitamin Products come from the same organization that pioneered in the research and large-scale production of thiamine, riboflavin, niacin, vitamin C, and other important nutrients. And now, the most recent contribution is thiamine mononitrate, a form of thiamine that has the advantage of greater stability in certain food applications.

With the enrichment program, as well as general food fortification, steadily growing in stature, Merck continues to lead in every distinct, forward step.

Merck Vitamin Products for Enrichment and Fortification

VITAMIN B_1
Thiamine Hydrochloride
Thiamine Mononitrate

RIBOFLAVIN
(Vitamin B_2)

NIACIN
(Nicotinic Acid)

ASCORBIC ACID
(Vitamin C)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers • Merck Vitamin Mixtures for Flour Enrichment • Merck Bread-Enrichment Wafers • Merck Vitamin Mixtures for Corn-Products Enrichment • Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

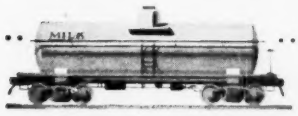
Merck Knows Vitamins

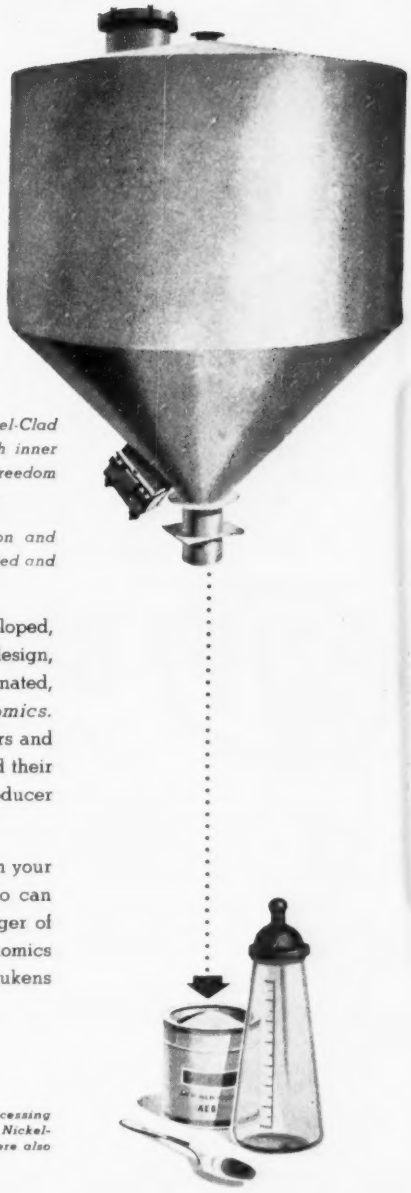
MERCK

MERCK & CO., Inc.
Manufacturing Chemists RAHWAY, N. J.
New York, N. Y. • Philadelphia, Pa. • St. Louis, Mo.
Chicago, Ill. • Elkton, Va. • Los Angeles, Calif.
In Canada:
MERCK & CO. Limited Montreal • Toronto • Valleyfield

Merck Vitamin Products for Enrichment and Fortification

How to Keep a Powdered Food Product From "Packing"...





EXAMPLE—*Economical, efficient handling in packaging a powdered, modified milk preparation to avoid product contamination and powder "packing" at M&R Dietetic Laboratories, Columbus, Ohio.*

DESIGN—*Tank with free-flowing contours built of Lukens Nickel-Clad Steel and equipped with powerful electric vibrators. Smooth inner nickel surface to insure protection of product purity and aid freedom of flow. Steel backing to give required strength and rigidity.*

RESULT—*Powder flows steadily to conveyor-packer, supervision and maintenance greatly reduced, washing out with water simplified and high purity easily maintained.*

These benefits are typical of results achieved with newly developed, more efficient food processing equipment. And wherever design, fabrication and materials selection must be critically coordinated, you will find the economical answer in applied *Lukenomics.* Lukenomics combines the experience of designers, engineers and equipment builders with Lukens' knowledge of materials and their application gained over 140 years as the world's leading producer of specialty steel plates, heads and steel plate shapes.

It's sound investment insurance to put Lukenomics to work on your equipment problems. There are progressive fabricators who can do this for you. Get in touch with them or write our Manager of Marketing Service, stating your problem. There's a Lukenomics team ready to go to work on it. Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

Glascote Products, Inc. fabricated the above processing tank for M & R Dietetic Laboratories using Lukens Nickel-Clad Steel. Lukens Flanged and Dished Heads were also used in the equipment.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

PROTECTION AND *Beauty*

* LOBSTER

** PEACOCK

KVP PAPERS *For The FOOD INDUSTRY*

Food products keep fresh in their natural state. Nature sees to that. But when they're prepared for human use extra-special care is required to preserve freshness, flavor, and keep out dirt.

Ordinary papers can't do that. KVP specialized food-protecting papers do it to perfection. And KVP artists and printers are noted for designs that add to sales appeal.

Have you any current packaging problems that involve "protection and beauty"? We'll be glad to hear from you.

INDUSTRIES SERVED

BAKING
Bread - Cracker
Cereal

MEAT
Packing - Locker
Retail

DAIRY
Butter - Cream - Cheese
Ice Cream - Milk

FISH - FRUIT - FROZEN FOODS
POULTRY - SHORTENING
VEGETABLE

*A hardshell denizen of coastal waters, having five pairs of legs, with the first developed into claws, or pincers. Very succulent when unwrapped.

**The male of the peafowl, noted for its tail feathers of striking beauty, highlighted with iridescent, eyelike spots.

Kalamazoo Vegetable Parchment Company

PARCHMENT · MICHIGAN

ASSOCIATED COMPANIES: KALAMAZOO VEGETABLE PARCHMENT CO., DEVON, PENNA.
KVP COMPANY OF TEXAS, HOUSTON, TEXAS
HARVEY PAPER PRODUCTS CO., STURGIS, MICHIGAN
IN CANADA: THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO · MONTREAL, QUEBEC

P—12A

IF IT'S

here...

IT'S news...

IT'S WORTH
STOPPING TO SEE!

Maybe Industry doesn't maintain show windows on Fifth Avenue or State Street or Wilshire Boulevard like America's great department stores. But your industry has a mighty effective show window... *and this is it*... this magazine. In these advertising pages alert manufacturers show their wares. Here you will find up-to-the-minute news about products and services designed to help you do your job better, quicker, and cheaper.
To be well-informed about the latest developments in *your* business, *your* industry... and to stay well-informed... *read all the ads too.*

McGRAW-HILL
PUBLICATIONS

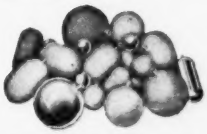
NICHOLSON TRAPS

UP STEAM FLOW 50%

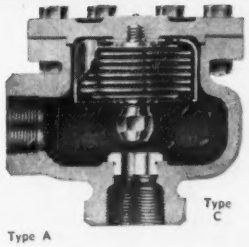
for Leading Processor

A striking increase in steam flow from 2000 to 3000 lbs. an hour is reported by a chemical maker who recently replaced a mechanical trap with Nicholsons. This cut cooking time from 105 to 55 min., a gratifying speed-up of 48%. Also widely recommended for their effective venting of non-condensible gases in critical applications.

5 TYPES FOR EVERY PURPOSE—process, heat, power; size ¼" to 2"; press. to 225 lbs. *BULLETIN 450.*



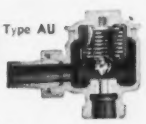
HIGH-PRESSURE FLOATS — Stainless, monel, plated steel. Welded. All sizes and shapes; for operating mechanisms and as vessels. 2-day delivery. *BULL. 348.*

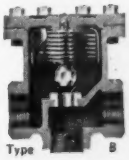


Type C

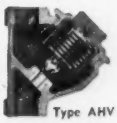
Type A

Type AU





Type B



Type AHV

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

New Jersey packer guards dried beef against contamination

● Glass jars are washed sterilized, dried, carried to packing table, then sealed and labeled—all on a Cyclone Stainless Steel Flat Wire Conveyor Belt. The entire process is speeded up—and no moisture remains in the jars to cause contamination.

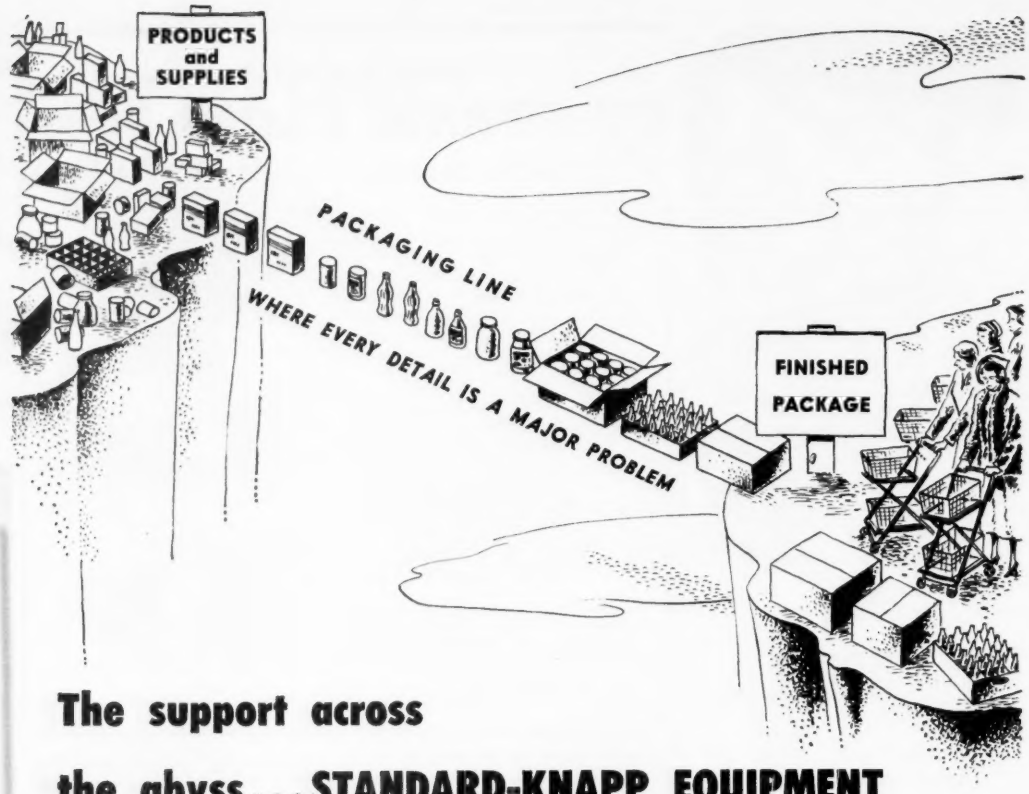
If you have a production problem or bottleneck in your plant, perhaps one of our three types of belts—Flat Wire, Chain Link, or Flex-Grid—can help you. Our experienced engineers will be glad to consult with you without obligation. Meanwhile, write for copy of our free Catalog #4.

CYCLONE FENCE DIVISION
(American Steel & Wire Company)
DEPT. H-90, WAUKEGAN, ILL.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

CYCLONE
METAL CONVEYOR BELTS

UNITED STATES STEEL



The support across the abyss... STANDARD-KNAPP EQUIPMENT

Keep your packaging line modern and equal in tempo along its length . . . eliminate the headaches and omissions of complicated maintenance . . . and you add dollars to your profits.

Prevent the bald-spotted profit margins that result from overlooking such details. Forestall the price rises that unhinge your salesmen's knees and take the snap out of your distributors' merchandising. The formula is Standard-Knapp Packaging Machines.

Engineered and built by men who have made the details of the packaging line a lifetime career, our machines step up efficiency, reduce overhead, simplify production and maintenance and beat down break-even points.

Claims? Not a bit of it, as Standard-Knapp installations in hundreds of leading plants attest. Keep your production line constantly at peak efficiency in every detail. Install Standard-Knapp Packaging Machines — they're *Automatically Preferred.*

STANDARD-KNAPP DIVISION OF HARTFORD-EMPIRE COMPANY PORTLAND, CONNECTICUT

WORTHINGTON REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

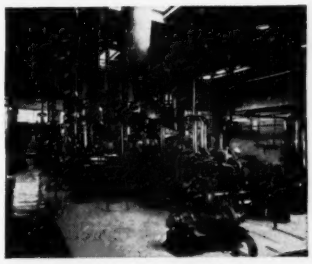
Specialists in air conditioning and refrigeration for more than 50 years

Ice-Making Fuel Cost Reduced by 40%

The Pacific Fruit Express Co. has an ice manufacturing and storage plant at Tucson, Ariz. for servicing perishable produce shipped by rail. This plant operates 24 hours per day and has a capacity of 250 tons daily during the peak season. They can ice 160 cars, 80 on each side of the platform in one spot.

The Worthington LTC-4 Gas Engine-driven Compressor installed at this plant is more economical than the steam-driven compressor it replaced, having reduced fuel cost by 40%.

The Worthington Compressor was installed in April, 1948, and is used for recirculation of ammonia gas in refrigeration plant. This 500 hp, 300 rpm machine runs an average of seven months per year, 24 hours per day and has given trouble-free operation.



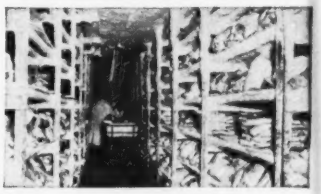
Main engine floor showing Worthington LTC-4 Ammonia Compressor driven by a Worthington gas engine.

Nothing Too Good for the Pigs

John Morrell & Co.—one of the largest pork meat producers in the world—has always been alert to technical progress. It was the first to wrap hams in parchment paper, first to pack lard in paper cartons, one of the first to install the revolving smokehouse.

When the company decided to increase the general refrigeration capacity of its plant at Ottumwa, Iowa, Worthington equipment was selected on the basis of favorable comparative operating cost figures.

That was over ten years ago, and the Worthington two-stage ammonia compressor is still operating in a highly satisfactory manner, in respect both to operating cost and absence of trouble.



Cold storage room at John Morrell & Co.'s Ottumwa plant.

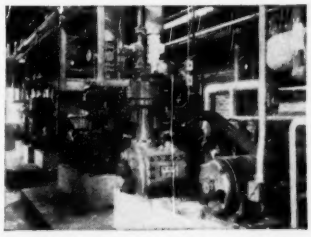
This compressor operates 24 hours a day with shutdown only during the coldest month for annual overhaul. It provides refrigeration for both freezing and storage (0 to 15 F).

Fully Automatic Refrigeration for First National Stores

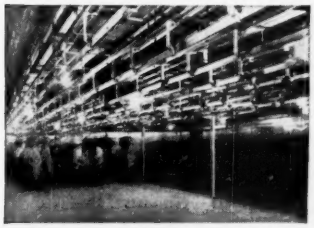
About 300 stores of the vast northeastern network of First National Stores are served by the warehouse in East Hartford, Conn.

This warehouse has recently been expanded by the construction of refrigerated compartments for banana ripening, meat storage and assembly, and cooling of pork products, corned beef and chicken.

A fully automatic system of refrigeration has been installed. It produces about 80 tons of refrigeration, and includes the following Worthington equipment: four 7 x 7 ammonia compressors, two 16 x 12 condensers, one 12 x 9 condenser, two 16 x 16 brine coolers, one 12 x 9 brine cooler.



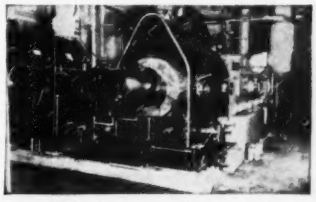
Four Worthington 7 x 7 VSA ammonia compressors. Condensers in background, brine coolers overhead.



Meat storage room—part of new addition to East Hartford warehouse of First National Stores.

There are two levels of brine refrigeration, one at minus 15 F, one at 12 F. Defrosting is done by hot brine in rooms served by pipe coils and by water in rooms served by product coolers.

Architect: Ganteaume and McMullen, Boston. Installation by Harding and Gross, Cambridge.



Type ODU Uniflo steam-driven Worthington ammonia compressor.

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

A complete line . . . in which *all* the vital components are *made*, not just assembled by Worthington. For *more worth with Worthington*, see your nearby Worthington distributor (consult Classified Telephone Directory).

Adding no flavor of its own...

Ac'cent®

PURE MONOSODIUM GLUTAMATE

intensifies and holds the good flavors already in the foods you pack!

Ac'cent enhances and blends the combined flavors of the food and the seasoning . . . gives a natural *flavor-heightening that makes a world of difference in the acceptance of processed foods.*

In 100 and 200 lb. drums for food canners and processors

Trade Mark "Ac'cent" Reg. U.S. Pat. Off.

CANNED MEATS

Many of the formulas given in this book for canning of meat products are improved in flavor by the inclusion of about 3 ounces of AC'CENT per 100 pounds of finished batch. The AC'CENT not only brings up the meat flavor but blends together the flavors of the seasonings so that they more perfectly complement that of the meat.

CANNED CHICKEN

A number of canners of whole and boned chicken have found that the addition of about an ounce of AC'CENT to 35 pounds of canned chicken (net weight of chicken and broth) brings out the fresh chicken flavor. Similar amounts of AC'CENT in chicken fricassee, chicken à la king and other chicken products not only bring up the chicken flavor but blend together the seasonings.

CANNED SOUPS

AC'CENT has been used more extensively in canned soups than in any other class of canned food. About 3 ounces of AC'CENT in 25 gallons of clear soup or 4 ounces in 25 gallons creamed soup bring out a richer, better balanced flavor. Condensed soups require proportionately more AC'CENT.

BABY AND JUNIOR FOODS

Baby food manufacturers are finding that the very bland character of many of their strained or chopped foods, particularly meats and vegetables, is perked up by the addition of small amounts of AC'CENT. As little as 1½ to 2 ounces of AC'CENT in 100 pounds of batch will bring out the flavors of the baby food and increase its acceptability.

CANNED FISH

Packers of canned salmon, tuna and other fish have found that 3 ounces of AC'CENT added to 100 pounds of their pack markedly raises the flavor level of the fish and rounds out the total flavor.

SAUCES

AC'CENT is a valuable ingredient in many sauces because of its property of blending the sharp spice notes with vinegar to make a smoother flavor. Use one to two ounces of AC'CENT, depending upon the type of sauce, to 5 gallons of sauce.

MAYONNAISE AND SALAD DRESSINGS

The growing interest in AC'CENT among mayonnaise and salad dressing manufacturers is caused by the remarkable flavor blending properties of this pure monosodium glutamate. As little as one ounce of AC'CENT in five gallons of dressing will give a richer, better blended flavor to these products and improve the flavor of salads on which the dressing is used.

PEANUT BUTTER

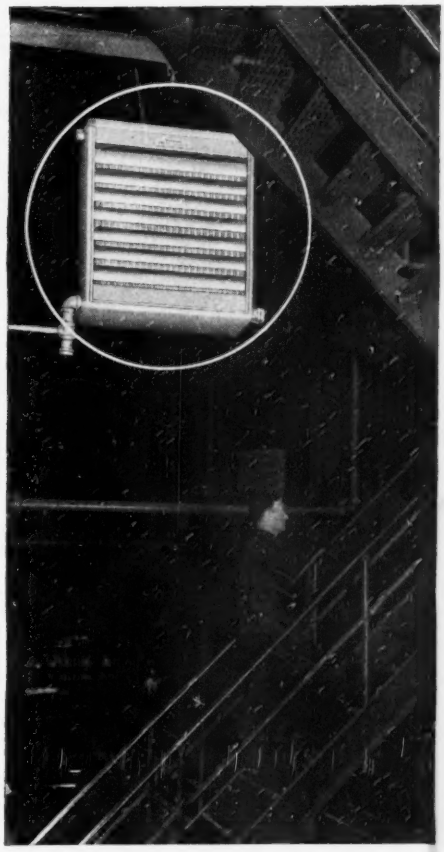
The inclusion of 4 ounces of AC'CENT in 100 pounds of peanut butter will noticeably bring out the nutty flavors, particularly those of peanut butters containing hydrogenated oils.

CANNED VEGETABLES

Write for results of tests made on the use of AC'CENT in vegetable processing. Demonstrations show it is a particularly valuable ingredient in canned asparagus, green beans, lima beans, carrots, whole kernel corn and spinach.

AT NO OBLIGATION, members of the Ac'cent technical staff will be glad to discuss with you in your plant the possibilities of Ac'cent in the foods you pack. Write: Amino Products Division, International Minerals & Chemical Corporation, General offices: 20 N. Wacker Drive, Chicago 6, Ill.

Speedheater installation showing simple piping connections.

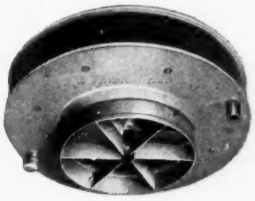


SOLVE YOUR HEATING PROBLEM NOW ...EFFICIENTLY, ECONOMICALLY

From basements to warehouses, from drying rooms to bus terminals, Sturtevant Speedheaters® offer the efficient, economical answer to your heating problem. Speedheaters provide faster heat delivery, better heat distribution, lower fuel costs. They do what old style heating systems fail to do . . . force warm air *down* into areas where it is needed most. Adjacent walls are "washed", not "baked" with heat, giving more uniform distribution over larger areas. And Speedheaters go to work immediately; there's no "warm-up" time and fuel lost.

For complete details, contact your local Sturtevant Distributor, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

FOR HIGH CEILING INSTALLATIONS — THE DOWNBLAST SPEEDHEATER



Forces warm air down into working area; greatly reduces ceiling heat loss; connections on both sides save piping costs; capacities from 40,000 to 400,000 btu.

CHECK THESE SPEEDHEATER FEATURES:

1. Fast Heat Delivery . . . with quiet-operating fan.
2. Low Maintenance Cost . . . single row radiator. Tested for 200 lbs. steam pressure.
3. Dependable Westinghouse Motor . . . backed by nation-wide motor service plan.
4. Simplified Installation . . . flat top construction permits installation directly to the ceiling . . . inlet and outlet connection on each side of heater.
5. Pliable Steel Hangers . . . can be shaped on job.
6. Available in 26 Sizes . . . from 25,000 to 400,000 btu.

YOU CAN BE SURE...IF IT'S

Westinghouse

J-80198

"SCREENING COFFEE" — AN ORIGINAL LITHOGRAPH BY HENRY WINZENREID

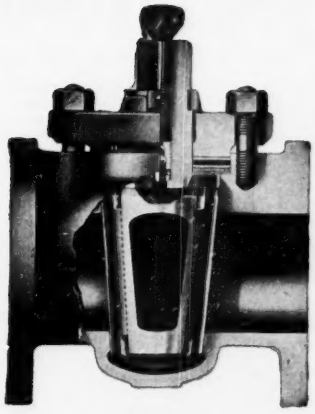
"There's an awful lot of coffee in Brazil"*

. . . but like hundreds of other good things, coffee needs the help of tailor-made protective papers to bring it roaster-fresh to your home. That's why millions of attractive and economical coffee bags are lined with a special type of Riegel Glassine.

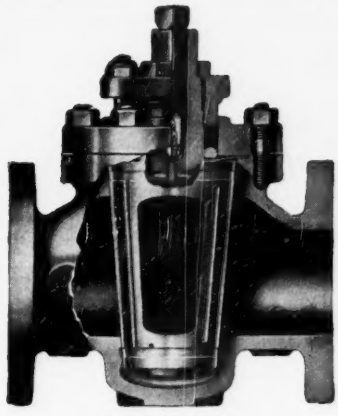
There's a Riegel Paper for almost any requirement you may have in protective packaging . . . a paper you can depend on for economy and production efficiency. We feel sure we can serve you in the same effective manner we now serve the sales leaders in so many different fields. Write us today and tell us what you want. **Riegel Paper Corporation • 342 Madison Ave., N. Y. 17.**

*Permission granted by Valiant Music Co., Inc.,

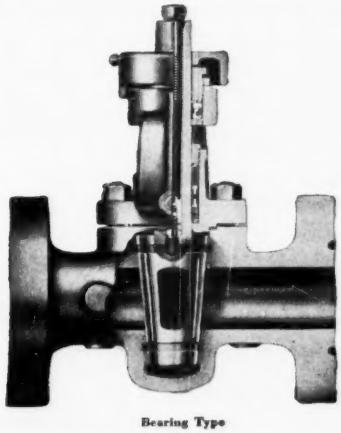
Riegel TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING



Single Gland Type



Regular Gland Type



Bearing Type

FOR HANDLING

Acids... Solvents... Sludges...

and other troublesome liquids—

USE WALWORTH LUBRICATED PLUG VALVES

When handling acids, condensates, dyes, oils, solvents, solutions, slurries and hundreds of similar "troublesome" liquids, you get better control, more dependable service and lower operating costs with Walworth Lubricated Plug Valves.

These valves have proved their ability to give easy operation . . . fast action . . . tight shut off . . . greater protection against corrosion. Turning is smooth and easy; just a ¼ turn from full-opening to full-closing. Moreover, Walworth Lubricated Plug Valves are tightly sealed against leaks — *whether open or shut.*

Walworth Lubricated Plug Valves are available in sizes ½" to 26" for pressures from 125 to 5,000 psi, and for vacuum requirement. For further information about Walworth's Complete Line of Lubricated Plug Valves, see your Walworth distributor or write for Catalog No. 46L.

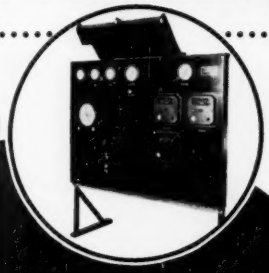
WALWORTH

valves and fittings

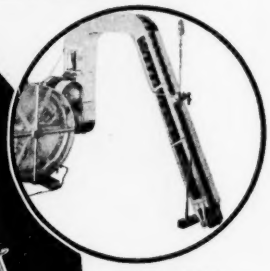
60 EAST 42nd STREET, NEW YORK 17, N. Y.

fmc STERILMATIC® Processing Equipment

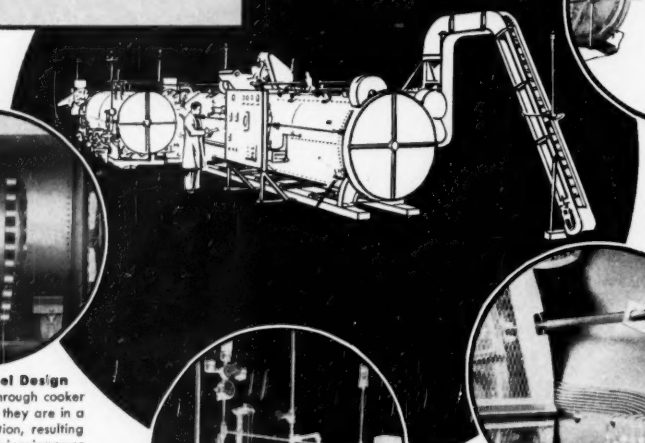
The "One-Man Cook Room" that saves steam - space - time

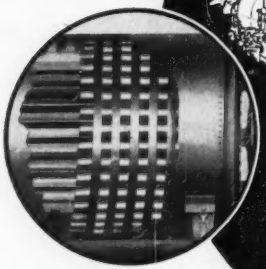


Centralized Control Panel
All control instruments, gauges, and electrical connections arranged and correlated so operator knows at a glance how entire machine is functioning.

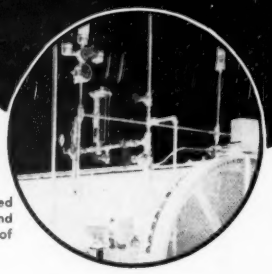


Positive Feed Elevator
Automatically positions cans in feed valve, eliminates can and product damage.

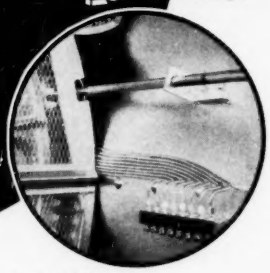




FMC Spiral Reel Design
Advances cans through cooker and cooler while they are in a free-rolling position, resulting in considerable savings in power and reel wear.



Automatic Stops and Signals
Protective stops and light signals located at critical points give instant warning and automatically stop machine in the event of improperly positioned cans, etc.



Banked Lubrication
Grouping of lubrication lines into banked blocks at centralized points eliminates scattered grease fittings, assures complete and proper servicing.

Representing a major advancement in modern sterilizing equipment, the completely efficient FMC Continuous Sterilmatic Processing Line is widely used today in the processing of virtually all types of canned fruits and vegetables. Canners are assured of reduced costs, increased cook room capacity, less cooking time, improved product flavor, better appearance, and a higher quality pack. This *"one-man cook room,"* centrally controlled, utilizes automatic protective stops and signals to avoid costly delays and damage to both machine and cans. Rolling agitation of each can results in fast, uniform heat penetration, and losses from over or undercooked batches are avoided. Smooth mechanical progression of cans from cooker elevator to cooler discharge reduces handling, eliminates denting and damage. Steam savings often reach 60% or more through greatly reduced processing time and subsequently lower heat radiation. Further savings in time, manpower and floor space contribute to the remarkable economy of the FMC Sterilmatic Pressure Cooker and Cooler.

Write for full information, or contact your nearest FMC representative.

First in Diversified Food Equipment

FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Divisions

General Sales Offices:

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High Speed Weighing With Superior ACCURACY-

Get Both With WRIGHT'S

HY·TRA·LEC

Crackers, cookies, pretzels, potato chips, candies. Products like these require accurate, gentle net weighing and filling.

. . . and to be efficient, the operation must be done at acceptable speeds and with a minimum of labor.

One hundred and twenty five leading food plants have found the answer. Wright's Hy-Tra-Lec Automatic weighers! Where bags are used or manual placement of container beneath discharge spout is desired, they use semi-automatic models. Where rigid containers are used, fully automatic systems are available. Range: one-half ounce to 16 ounces.

PROVEN PERFORMANCE

Time tested. User approved. Repeat orders prove Hy-Tra-Lec's worthiness.

Keep ahead of competition. Reduce your packaging costs with Wright Hy-Tra-Lec net weighing and filling systems. Mail the coupon below now.

Hy-Tra-Lec is EXCLUSIVE with Wright. This modern weighing system is based on the principles of "positive displacement" and departs from conventional beam or scale methods.

User reports reveal that Hy-Tra-Lec is relatively trouble-free and requires a minimum of maintenance attention.

Wright Machinery Company
333 Calvin Street, Durham, N. C.

Gentlemen: Please send me latest information on your Hy-Tra-Lec Automatic Weighers.

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ESTABLISHED 1893 · DURHAM, NORTH CAROLINA
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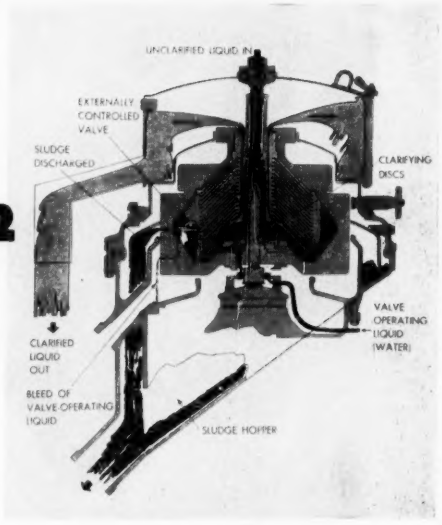
COMPANY SALES OFFICES: JERSEY CITY · CHICAGO · DURHAM WEST COAST REP.: KING & ANDERSON, SAN FRANCISCO SOUTHWEST REP.: R. P. ANDERSON COMPANY, DALLAS CENTRAL REP.: HAL HUDSON EQUIPMENT COMPANY, TOLEDO EUROPE: SPERRY GYROSCOPE COMPANY, LTD., LONDON

if you make a Concentrate

The SHARPLES DV-2 Can

- ★ Remove solids of practically any desired particle size from the liquid.
- ★ Produce a clear serum by removing all pulp, if desired.
- ★ Extract the amount and size of particles remaining in the concentrate by fractionation or classification.
- ★ Maintain constant consistency of concentrate regardless of fluctuations of rate or solids content of feed.

While doing the above, removal of undesirable insoluble impurities is assured.



THE NEW CENTRIFUGAL TOOL WITH THE FLEXIBILITY REQUIRED TO MEET THE MANY VARIOUS PROCESSING NEEDS

The Sharples DV-2 automatically discharges solids through *externally controlled valves* located around the periphery of the bowl. The frequency and duration of valve opening can be accurately controlled for varying conditions as desired. Liquids and solids are discharged continuously.

SHARPLES

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the new assay method for **vitamin A** is good for the industry

WELL over a decade ago DPi applied molecular distillation on a commercial scale to fish liver oils. Our concentrate established new standards of quality, uniformity, blandness, and stability for natural vitamin A.

In 1948 DPi introduced the first synthetic vitamin A available in commercial quantity on the American market. It has been in continuous successful production under the trademark "Myvax."

Each has its own advantages.

As producers of the best in natural and synthetic vitamin A, we like to see it traded as an accurately characterized, precisely measured commodity. A long step forward in that direction, we believe, is the new assay method for vitamin A in the recently issued Fourteenth Revision of the United States Pharmacopeia. The background and implications of this method should be understood thoroughly by all vitamin A buyers.

That's why we've issued a booklet called "U.S.P. XIV and the Vitamin A Business." It answers such questions as:

Why a new assay method?
U.S.P. units or micrograms?
What is the identity test?
Where does the new method apply?
How does the new assay method affect vitamin A buying?

For your copy, or for the latest quotations on natural or synthetic vitamin A or natural vitamin E, write, wire, or call ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 135 South LaSalle Street, Chicago 3, Ill. • Gillies & Loughlin, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

leaders in research and production of both synthetic and natural vitamin A

DPi

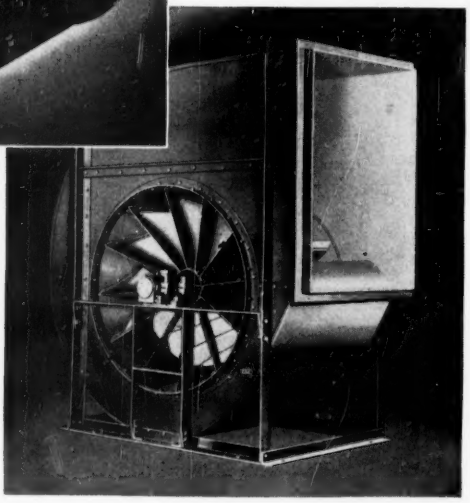
Also...high vacuum equipment...distilled monoglycerides...more than 3300 Eastman Organic Chemicals for science and industry

Don't Give Space to Worn Out VENTILATION EQUIPMENT

It's Profitable To Replace with "Buffalo" FANS

AXIAL FLOW FANS

For light-duty ventilation and air conditioning work, when mounted in straight runs of ducts, it's one of the most efficient fans on the market! It's lightweight for low-cost installation, takes minimum space, costs little for power and maintenance. You'll save money right from the beginning with the right "Buffalo" Fans, Because they're built to perform most efficiently on the specified job.



WRITE FOR BULLETINS 3533-C and 3737

LIMIT-LOAD FANS

Like "Buffalo" Axial Flow Fans, "Buffalo" Limit-Load Fans are widely used for ventilation and air conditioning work. However, "LL" Fans are specified where installation is near **curved** duct connections. And, though both fans cannot be overloaded, regardless of system pressures, "LL" Fans are more efficient for higher pressure work, such as supplying air for large air washers. Your "Buffalo" engineer can advise you as to the **right** fan — write us for his name and address.

"Buffalo" FIRST FOR FANS

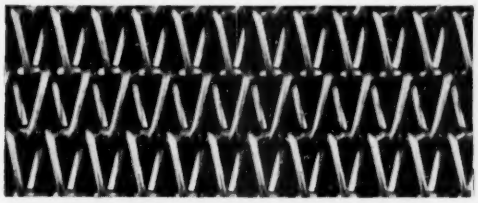
BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont., Branch Offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

WISSCO BELTS



For faster production . . . lower handling costs

For even-flow production in food processing operations involving temperature extremes, you'll find the answer to lower handling costs and dependable efficiency in Wissco Metal Processing Belts.

Engineered for specific job demands, Wissco Belts are fabricated in various weaves of special alloys resistant to heat and corrosive action. Because of their open mesh construction Wissco Belts assure free air circulation and free drainage, make possible easy cleaning. *Write for catalog describing their adaptability and many uses.*

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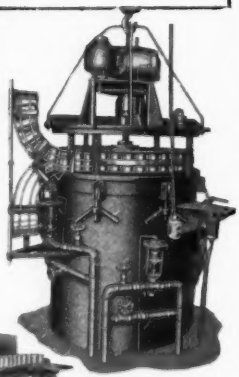

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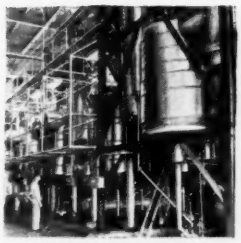

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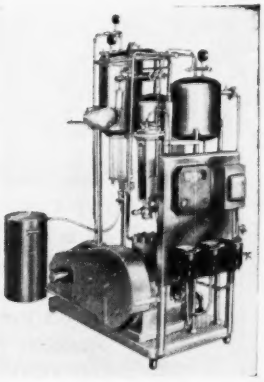

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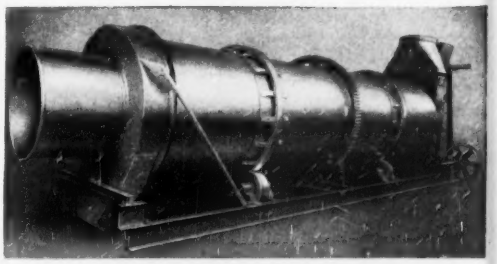

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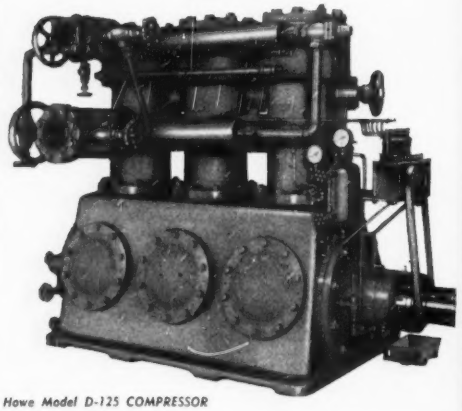

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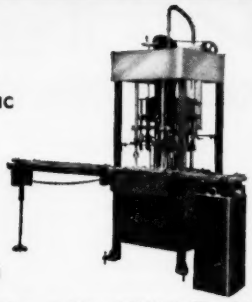

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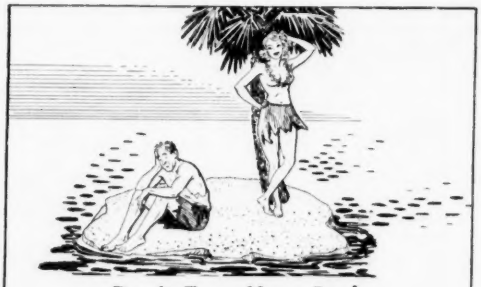

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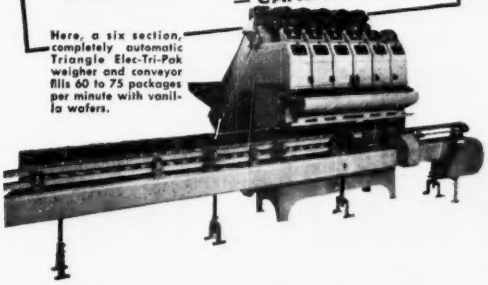

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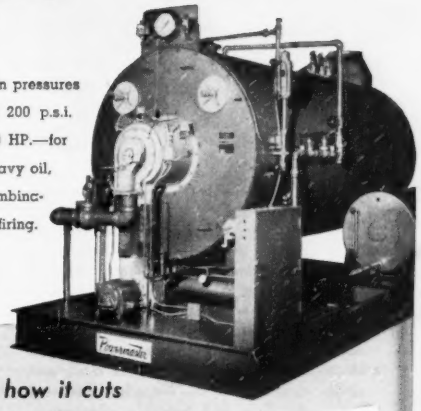

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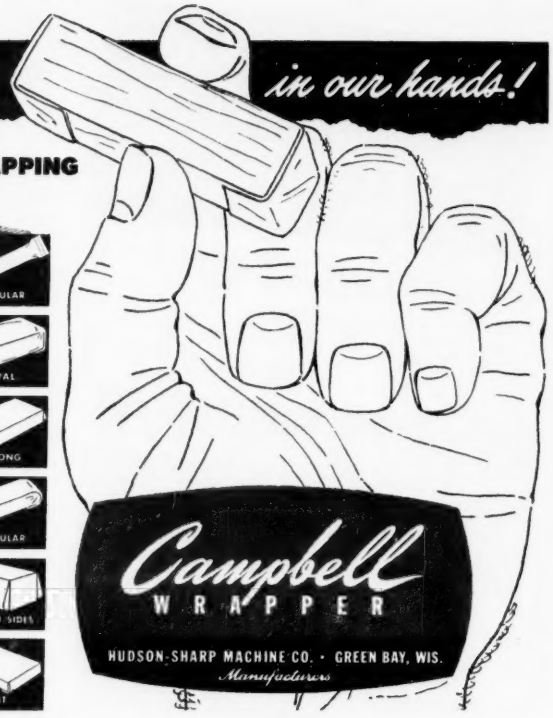

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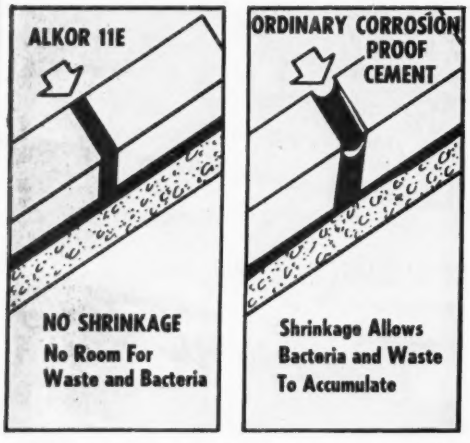

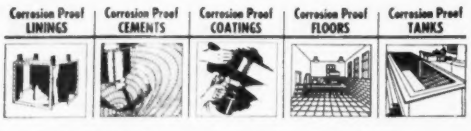

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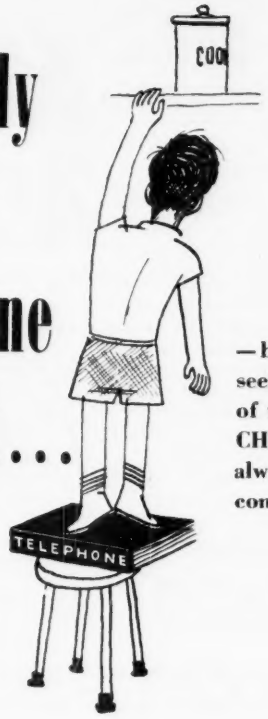

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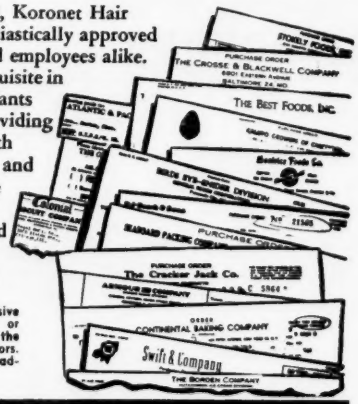

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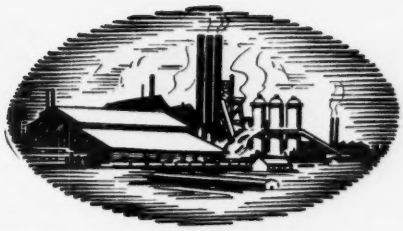

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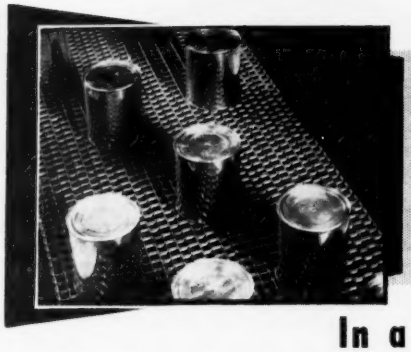

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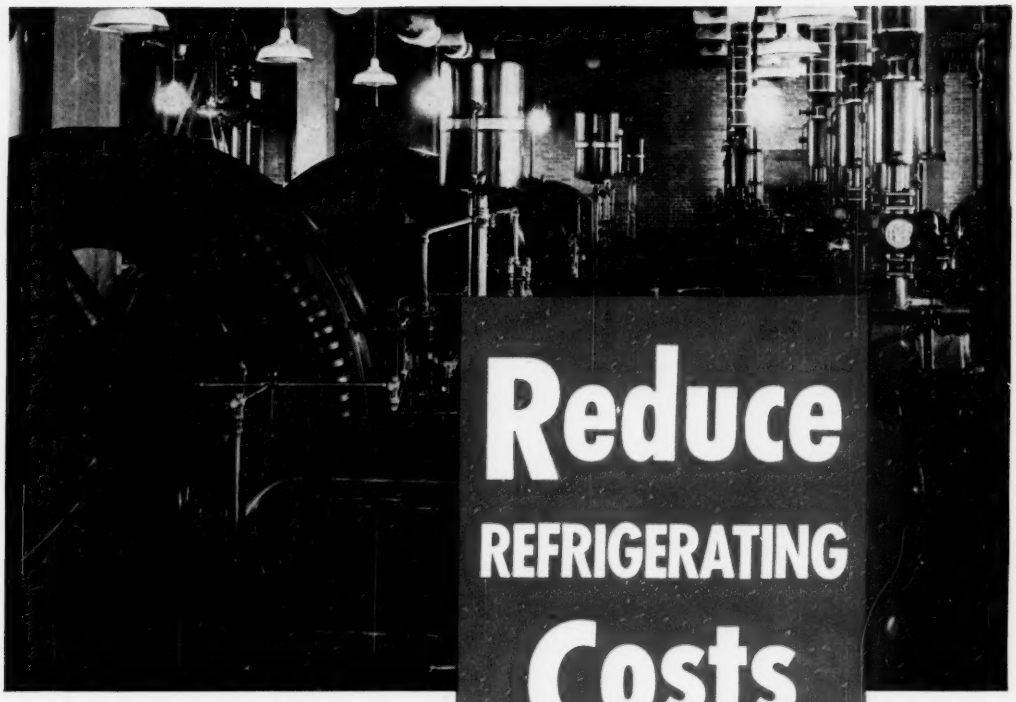

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